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\*Illustrated.

THE article on the Steel Passenger Car Situation in this issue is the first of an extensive series of carefully prepared studies on timely subjects, which are in course of preparation and will be published in the *Railway Age Gazette* during the coming year. These will cover the more important problems now before the railroads in all of their departments and particularly in the operating, mechanical, and engineering branches, and in regard to the relations of the railways to the public. These studies will be prepared by experts on our staff, and no effort or expense will be spared to make them as comprehensive and thorough as the nature of the various subjects will permit. This is the most important and far-reaching program ever undertaken by a technical publication.

WHEN the radical change in design from wood to steel passenger train cars is considered, the rapidity with which steel cars have been introduced on American railways is truly remarkable. Five years ago there were only about 400 such cars in use on steam roads, and most of these were in the nature of experiments, necessitated largely by the electrification of the steam roads in and about New York City. To-day there are about 9000 such cars in use, or between one-seventh and one-sixth of the total number of passenger train cars in service. Many roads have all of their higher class passenger trains equipped with steel cars. The roads generally have stopped ordering wooden cars. Several bills have been introduced in Congress to the effect that the railways must use nothing but steel passenger train cars after certain dates, the longest period provided being too short to permit the building of a sufficient number of steel cars to replace the wooden ones now in use without very greatly adding to the present facilities for manufacturing such cars. The great cost of making the change within the limited periods proposed, instead of allowing the introduction of steel cars as the older ones require replacement, will prevent the railways from making other improvements which are of greater importance viewed from the standpoint of safe operation. In the article on the Steel Passenger Train Car Situation, which appears in another part of this issue, are discussed other reasons why Congress, if it feels that a law regulating the introduction of steel passenger train cars is necessary, should not attempt to designate the conditions under which this change should be made, but should refer the matter to the Interstate Commerce Commission or some board of experts which, after thorough investigation, will have power to deal with the matter for the best interests of all concerned.

AN interesting plan for increasing the supply of freight car equipment, and at the same time beginning an experiment on a comparatively small scale of the plan of pooling cars, which has long been under consideration by leading transportation authorities, has been suggested by Newman Erb, president of the Minneapolis & St. Louis, as outlined in a letter to this paper on another page. Mr. Erb proposes the forming of an association to which the railways of the country would subscribe a fund of \$25,000,000 in five annual payments based on their mileage or density of traffic, to be used as the basis for a credit of \$200,000,000, or enough to buy 200,000 cars. He believes that with the joint credit of the roads back of the association 20 or 30 year serial equipment bonds could be marketed readily, and that the per diem payments would more than defray the interest requirements, renewals, and insurance and gradually amortize the principal. Mr. Erb has not elaborated the details of the plan, but simply outlined it in the hope that its presentation may invite discussion. On the basis of \$20 a mile, the annual payment of a 10,000 mile railway system would be but \$200,000, and for a lesser road the original subscription on the basis of either mileage or density would be almost negligible. The stronger roads financially would, therefore, be able to continue to purchase equipment for their own needs as at present. A valuable addition would be made to the present supply of cars without affecting

the credit of individual companies in the way that equipment purchases now frequently do. The per diem charge is now supposed to represent the cost of owning a car, and the annual revenue from per diem at 45 cents per day, on 200,000 cars, assuming they were all in service at a time, would amount to \$32,850,000 in a year. The interest on \$200,000,000 at 5 per cent. would be \$10,000,000 a year, leaving nearly \$23,000,000 a year for insurance, renewals and the retirement of the equipment bonds. Repairs other than those now considered as owner's defects would naturally be paid for by the lines using the cars. Under existing conditions the freight car equipment of the country is handled not as if it were private property, but as if it were the property of a national railway system, but without the regulation that would be imposed if it were under a central control. A car pool would apply a plan of regulation to the existing methods. Mr. Erb's plan goes farther and substitutes for the varying credits of individual companies the joint credit of the railways of the United States.

IT is announced that the Pennsylvania Railroad is considering the advisability of establishing a rule that employees shall live, or take their rest, sufficiently near to their work to enable them to report for duty at any hour, day or night, with not more than one hour of necessary traveling between their home or resting place and the point where they begin work. Cases have come to the notice of the management wherein men live from 50 to 100 miles from the places where they report for duty. This subject came up in connection with the collision at North Haven, September 2, the engineman at fault in that case having spent four or five hours on the road to and from his work. He was on duty about 10 hours a day, but slept in his bed only about 5 hours. To say that the Pennsylvania is "considering" the advisability of establishing a time limit rule must be inaccurate. The officers, no doubt, are considering how soon the rule shall be put into effect, and how large a range of residence territory shall be allowed; but as to the main thing, the need of a rule, it cannot be that they will require many minutes to decide, and to decide in favor of it unanimately. And there cannot be much to be said in favor of long delay. It is a temporary hardship to have to change one's residence, but an allowance of a month is usually as good as a year. And every engineman can reflect that he himself is partly and perhaps, usually, wholly responsible for any unreasonable schedule that he has adopted or accepted. In other words, the proper adjustment of rest conditions should have been made each time he changed his regular run, settling the question of the financial burden of each change on its own merits, and not allowing burdens to accumulate. The frequent changing of men from one run to another, which has come into vogue so widely since seniority rights have been administered under the hair-splitting rules now everywhere in effect, is a distinct detriment to the service. It is the cause of much of this rest-time evil. There ought to be a radical reform. General Manager Bardo, in announcing recently the new rules which had been adopted for the enginemen of the New Haven road, assured the men that the rules were framed so that no favoritism could creep in. That is in accord with the spirit of all equitable agreements with employees, and is commendable, in principle; but this theoretical impartiality may be carried too far. Favoritism ought to be favored instead of frowned on, if that is the only means of keeping enginemen on the same runs a reasonable length of time. A company is morally bound to favor itself—favor the safety of life and limb—at least a part of the time. To perform his best service an engineman should have a regular run and should have approximately the same part of the 24 hours every day (not day and night alternately); and, having learned a run, he should not be changed to another except for good reasons connected with the good of the service. It cannot be said to be for the good of the service to promote a man very frequently (where promotion involves change of residence) just because that course is necessary to prevent some younger man from getting a slight advantage. Slight injustices, if they cannot be avoided, can be compensated in some way.

THE time to be allowed an engineman or fireman to spend going to and from his work is also a matter requiring careful attention. (Conductors and brakemen can rest, on duty, in the caboose.) Two hours (one hour each way) is a very long time to allow for this purpose. With that lee-way men will live 40 miles away from their proper and normal headquarters; they will be delayed now and then and be late in reporting for duty, and will be tempted to try to do some of their resting on the road. Many will yield to that temptation, trying to convince themselves that lying curled up on a seat in a passenger car is a proper way of resting. It is not, of course, the duty of the company to compel men to take proper rest, for it could not perform that duty if it tried; but it can refrain from encouraging the habitual practice of taking rest improperly. A rule requiring men to sleep within a certain very limited distance from the starting point of their run is entirely reasonable. A time limit allows too much uncertainty as to locality, and is justifiable, if at all, only because of the necessity of compromising with long-standing customs. One way in which men employed on trains will misuse the time allowed for rest, unless their judgments and their consciences are well educated, is set forth very suggestively in a letter recently published in *Memphis, Tenn.*, and reprinted in the *Railway Age Gazette* last week, page 927. That letter can be taken only as a suggestion, for its writer does not disclose his identity; but the suggestion is so true to life that our readers will ask for no corroboration. The need for educating the judgments and consciences of men exists everywhere. So far as concerns men on through freight runs, the habit of having no regular habit in the matter of eating, sleeping and resting is fostered by the constantly irregular hours of work, and usually is made compulsory. For this irregularity the companies are at least as much to blame as are the men; and theoretically the employer is wholly responsible, for the public—that is, the government—must hold the proprietors of a railroad responsible for its safe operation. They must take all reasonable precautions against dangers. It may be said that this irregularity of hours does not constitute a great danger. But even small dangers must be avoided, if avoidance is reasonably practicable; and who will say in this matter it is not reasonably practicable?

#### THE ILLUMINATING STRIKE ON THE SUNSET LINES.

THE strike of engineers, firemen, conductors and brakemen on the Sunset Lines of the Southern Pacific Company in Louisiana and Texas was short-lived. It began on November 13 at 7 p. m. and ended on November 17. But it was long enough strikingly to illustrate the conditions that exist on many of the railways of this country, and it will be extremely unfortunate if the illustration fails to make the impression it should on the minds of the American people. This strike was chiefly over the question of the discipline of employees. The want of proper discipline is the worst curse of railway operation in this country, and has been for years. It interferes with economy in operation and therefore makes the cost of the service to the public unnecessarily high. And it is likewise the cause of at least four-fifths of all railway fatalities and injuries other than those to trespassers. An excuse repeatedly offered by railway officials in investigations of accidents has been that they have been caused by the failure of employees to obey the orders of their superiors or the rules of the companies. This defense has not been accepted by railway commissioners or the press, who have made answer that it is the very essence of the function of railway operating officers to see that employees do understand and obey orders and rules. In his report of the investigation of the North Haven accident on the New Haven, Commissioner McChord, of the Interstate Commerce Commission, severely arraigned the former management of the New Haven because it had not maintained proper discipline.

The evidence shows that the management of the Sunset Lines has not recently been fairly subject to any such criticism. The employees have complained of the discipline administered by it



as too severe. The management in dealing with the grievance committees of the individual brotherhoods stood firm. Finding that individually they made no headway against it the committees of the Order of Railway Conductors, the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Engineers and Firemen and the Brotherhood of Railroad Trainmen formed a co-operative committee and demanded that the management should deal with it. The management saw that this was merely a scheme for strengthening the pressure of the brotherhoods. It, therefore, refused to meet and confer with the co-operative committee except regarding matters in which all of the employees represented by it had a common interest. The ostensible reason for the strike was this refusal of the management to meet the co-operative committee. But it is plain that this was not the real reason. The management offered to submit the controversy to the federal mediation and conciliation board. This proposition the employees refused; and all the evidence shows that their main purpose was by one means or another to force the management to relax the discipline which was the basis of a large part of the grievances assigned as the grounds for the strike.

Since the strike plainly was in the main an attack on the discipline administered by the management, it is desirable to know the causes and nature of this discipline. The employees have made public a list of 67 alleged grievances. The management in reply has made public detailed statements of all these 67 cases. Space will not permit us to publish analyses of all these cases, but we give below brief analyses of 30 of them. It is to be wished that every citizen of the United States might read these analyses, for they throw more light on the conditions affecting discipline on American railways, and the attitude of the railway brotherhoods toward it, than any other information which we have ever known to be put in print:

No. 1 is a demand for reinstatement of an engineer and a conductor with pay from date they were relieved from the service until date of their reinstatement. These men were discharged for operating a train over a bridge in course of repair, over which speed was limited by special instructions to four miles per hour, at a much higher rate, resulting in derailment and consequent heavy loss.

No. 2 is a demand for the reinstatement of an engineer and a conductor who were discharged because of violation of the rules of the company. The superintendent found these men on the main line with a light engine on the time of a passenger train without protection. They thereby created a condition which greatly endangered many innocent persons.

No. 3 is the protest of an engineer and a conductor against the assessment of demerits against their records for responsibility for a serious accident due to their having exceeded speed prescribed by special time table instructions; also a protest against another assessment of demerits against the same conductor on account of improper handling of live stock and a request for the reinstatement of this conductor, he having been relieved from the service on account of an accumulation of demerits.

No. 4 is a demand for reinstatement of an engineer discharged on account of responsibility for a rear end collision. A plea for leniency was originally presented, the responsibility of the engineer being admitted. On account of gross carelessness displayed by him the plea was denied.

No. 5 is a demand for reinstatement of an engineer discharged on account of having given up an engine on the road and reported it was not safe to move, when, in fact, the engine was put in shape to move a full train in a very short time.

No. 6 is a demand for the reinstatement of an engineer discharged for allowing his engine to run out of water, when all that it would have been necessary for him to do would have been for him to have fired up the pump boiler and pumped enough water to supply the engine. Investigation developed that the engineer had been drinking on the trip.

No. 7 is a demand for the reinstatement of an engineer discharged for violating the company's rules by exceeding speed restrictions over a certain portion of the line, thereby creating danger of accident.

No. 11 is a complaint of enginemen against being required to make entries on a printed form after completing a trip or a day's work showing their hours of service and hours of rest, which report is necessary in order to prevent violations of the federal hours of service law. The case was handled by the joint working board, and as the reports were absolutely necessary, a demand for discontinuance of the practice was denied.

No. 14 is a complaint against engineers being required to make reports of fuel used on trips. These reports are necessary in order to keep a check on fuel, a very heavy item of expense, and to prevent waste. The practice is of long standing.

No. 26 is a demand for reinstatement of a conductor with full pay, who had been discharged for failing to comply with rules, thereby causing a serious rear-end collision.

No. 27 is a demand for reinstatement of seven passenger conductors who were dismissed because their services were no longer desired. The grievances of these men have never been discussed by the general committee of the conductors' organization with the general officers of the company, as required by practice of years' standing, and are not properly in the hands of the grand officers of the organization.

No. 28 is the protest of a conductor against assessment of demerits for violation of rules covering handling of train orders. The case has never been discussed with general officers of the company by the general committee of the conductors, and is not properly before the grand officers.

No. 29 is a demand for reinstatement of a conductor with full pay. The conductor was discharged for violating the rules by failing properly to protect his train, thereby inviting an accident. The case has never been discussed with the general officers of the company by the general committee and is not properly before the grand officers.

No. 30 is a demand for reinstatement of a switchman with pay. He was discharged for failure to report for duty at the time and place designated by the yardmaster as provided in the yardmen's agreement.

No. 31 is a demand for reinstatement of a brakeman with pay. He was discharged for refusing to pilot the engine of the train upon which he was working from a yard track to the roundhouse in the absence of the yard men.

No. 32 is a demand for reinstatement of a brakeman with pay. This man was relieved from train service because of his inability to read and write, making it impossible for him to pass written examination on train rules. He was offered employment in another capacity where his educational disabilities did not disqualify him.

No. 38 is a demand for reinstatement of three switchmen with pay. They were discharged for refusing, in succession, in an emergency, to act as foreman on a yard engine when directed to do so by the yardmaster. Insubordination meets with summary action on all railroads, and, in the interest of discipline, cannot be tolerated.

No. 39 is a demand for reinstatement of a switchman with pay. He was discharged for refusing, in an emergency, to act as foreman of a yard engine when directed to do so by his yardmaster.

No. 40 is a demand for reinstatement of a switchman with pay. This switchman was laying off and refused to return to work in an emergency, and when directed to do so by his yardmaster. Another case of insubordination.

No. 43 is the protest of a conductor against demerits for violation of rules governing handling of train orders.

No. 44 is a demand for reinstatement of an engine foreman with pay. He was discharged for failure to comply with the company's rules governing protection of his engine and cars against second class trains in yard limits, resulting in a collision.

No. 49 is a demand for reinstatement of a switchman dismissed for engaging in a fight with a night yardmaster. The case has never been discussed by any committee with the general officers, and they are not familiar with the facts in the case.

No. 54 is the protest of an engineer against assessment of demerits for interfering with a division officer who was engaged in making an efficiency test.

No. 55 is the protest of an engineer against assessment of demerits for failure to make time with a stock train. Investigation developed that the engineer did not perform his whole duty, or use his best efforts to get over the road.

No. 56 is a protest against the re-examination of engineers on train rules and mechanical re-examination of engineers. These re-examinations have been required from time to time for many years and are necessary in order to maintain the proper standard of efficiency.

No. 58 is the protest of an engineer against assessment of demerits for allowing an engine in his charge to fail on the road, when, by proper efforts, the failure could have been avoided.

No. 60 is a request for reinstatement of a conductor with pay. He was dismissed for violating positive instructions with respect to the sixteen-hour law.

No. 65 is a request that instructions issued September 11, 1912, by the Southern Pacific Company (Pacific System) relative to employees who took the places of striking shopmen be issued and made effective on the Sunset lines. This case has never been discussed with any committee and the officers do not know what instructions are referred to.

No. 66 is a complaint against alleged misapplication of the Brown system of discipline. This case has never been discussed with any committee and the company's officers do not know what the complaint consists of.

No. 67 is a request that in making surprise or efficiency tests, the officials making such tests will change indicators, uncover headlights, turn markers, etc., themselves, instead of requiring employees in train and engine service to do so.

When in the past it has been charged that the labor brotherhoods positively, deliberately and persistently interfered with discipline in such a way as to hinder railway officers in their efforts to increase the economy and safety of transportation the charge has been denied by the spokesmen and defenders of the brotherhoods. They have said that while the brotherhoods may never have done anything positive to promote safety, they never have done anything that positively interfered with it. Who

will ever again, after this astounding strike on the Sunset lines, have the bald effrontery to offer any such defense of the brotherhoods? This strike indicates, as has no other event in the history of the railways of this country, a peril with which the managements of the railways and the public are confronted. It shows not only that the brotherhoods do deliberately, persistently and in the most unreasonable way interfere with discipline, but that they have so little respect for the rights and interests of the public that they will unhesitatingly tie up whole railroad systems, regardless of the losses inflicted on innocent persons, if they conceive that they may thereby make their interference with discipline more effective. Never before was there so strikingly demonstrated the need for legislation prohibiting strikes on railroads before arbitration, and turning over to some permanent board the arbitration on their merits of all controversies arising between railways and their employees.

#### THE SHIPPERS AND BOX CAR POOLING.

IT is not only in periods of car shortage that the public is interested in the freight car question and the rules which the railways have in effect for the interchange of freight cars. These rules are formed largely on the theory that foreign cars will be returned to their owners, and it is only too frequently that this theory runs against the immediate interests of the public. Indeed, it is maintained by some that the home-route theory is generally against the real interests of the public.

Whenever freight is offered for shipment in one direction and the only available cars route home in another direction, there is a chance for friction with the shipper. Either the shipment is delayed until other cars are secured, or the cars on hand are loaded away from home.

Further, in cases where consignees desire to load out foreign cars received under load, there is continual trouble, and sometimes delay, when the route their freight should travel does not fit the home routing of the cars. In large works where the shippers do their own shifting there is often a very considerable expense involved in shifting out empties which are not available for outbound loading, and shifting in the proper empties. This is especially the case in large competitive points where the solicitation of traffic is brisk.

Railway men are apt not to do the shippers justice for the work they do in this direction. They so often hear complaints from car owners in cases where shippers insist on the "diversion" of foreign cars that they perhaps do not fully appreciate the cases where shippers are trying to help them to return cars to their owners.

Under the circumstances, it is not surprising to find that shippers generally are in favor of the pooling of freight cars by railways.

This is evidenced by the recent action of the National Industrial Traffic League in approving the report of its Committee on Transportation Instrumentalities, which is published in another column. The report recognizes the great difficulties inherent in the question, but gives as the view of the League that "a pool of common box cars seems to afford the necessary relief."

The League understands that the American Railway Association is now soliciting mail advices from its members on the question of a standard box car 40 feet long. This would seem to be in line with the recommendation recently made by President Ripley, of the Santa Fe. The League also quotes, with approval, from the report of the Commission on Car Service to the American Railway Association made some months ago.

It is pointed out that the chief defect in the present rules for the interchange of cars lies in the fact that every car is subject to the same rule. Now, there are a great many different kinds of cars. It may well be that all box cars should be handled under exactly the same rules, or that all flat cars should be handled under the same rules, but it seems a question whether cars built for special purposes should be handled under exactly the same rules as cars which can normally be used by any railroad

and at any time. The League recognizes that there are certain special types of equipment which should be returned promptly to the owner even if this invariably entails empty return mileage. Such cars can be very properly handled under the present rules of the American Railway Association.

On the other hand, there are general service cars, of which the common box car is a chief type, which can be used advantageously everywhere. The League believes that a rule should be so devised that these cars can be used so as to carry as much freight as possible, and make as little empty mileage as possible, and with the elimination of all unnecessary switching.

There is no doubt that the present car service rules of the American Railway Association, if pushed to their logical conclusion, result at times, and with certain kinds of cars, in unnecessary mileage to the railways, and a corresponding car shortage to the shippers. Even in times of car surplus, they result in expense and delay, both to the railways and shippers, which it would be well to avoid.

It is to be hoped that the American Railway Association will take some forward step with respect to this situation.

#### NEW YORK, NEW HAVEN & HARTFORD.

NOTWITHSTANDING the part that has been played by the New Haven subsidiaries in recent discussions of this company's affairs these subsidiaries are of minor importance, not only to the public served, but also to the New Haven security holders, compared to the economical operation of the great railroad property itself. In proof of this it is only necessary to point out that whereas in 1913 the deficit, after paying  $7\frac{1}{2}$  per cent. dividends, was \$4,564,000, if the railroad had had transportation expenses (excluding, of course, maintenance charges) as low per train mile as the New York Central & Hudson River, and revenue, maintenance, taxes and fixed charges and other income had all been the same, the New Haven income account would have shown a surplus of more than \$1,000,000. Transportation expenses per total revenue train mile on the New Haven in the fiscal year 1912-1913 were \$1.07; on the New York Central in the calendar year 1912 these expenses were 84 cents. Now the interesting point about this lies in a study of why transportation expenses per train mile are so much higher on the New Haven than on a road like the New York Central. If, of course, the entire difference or the greater part of the difference was within the power of the management to remedy, the prospects of the New Haven would be good indeed.

Comparing the transportation expenses in detail, there are certain discrepancies which must be eliminated at once. The New Haven has a debit of \$1,046,000 for operating joint yards and terminals, with an offsetting credit of but \$89,000, while the New York Central has a debit of \$381,000, with a credit of \$953,000. This is a total difference of \$1,529,000. The New Haven charges \$686,000 for operating floating equipment, for which there is no corresponding charge in the New York Central's transportation expenses.\*

It should also be remembered that nearly two-thirds of the total train mileage on the New Haven is made by passenger trains, while only slightly more than half of the New York Central's train mileage is made by passenger trains. The most noticeably higher costs per train mile on the New Haven as compared with the New York Central are shown in the following table:

	New Haven.	New York Central.
Station employees and station supplies expenses	20.6	14.1
Road trainmen	12.2	10.4
Fuel	19.1	15.1

This table could be carried considerably further, and on the other hand there are items under transportation expenses which are lower per train mile on the New Haven than on the New York

\*The New York Central includes in its auxiliary operations harbor terminal transfer both revenues and expenses.



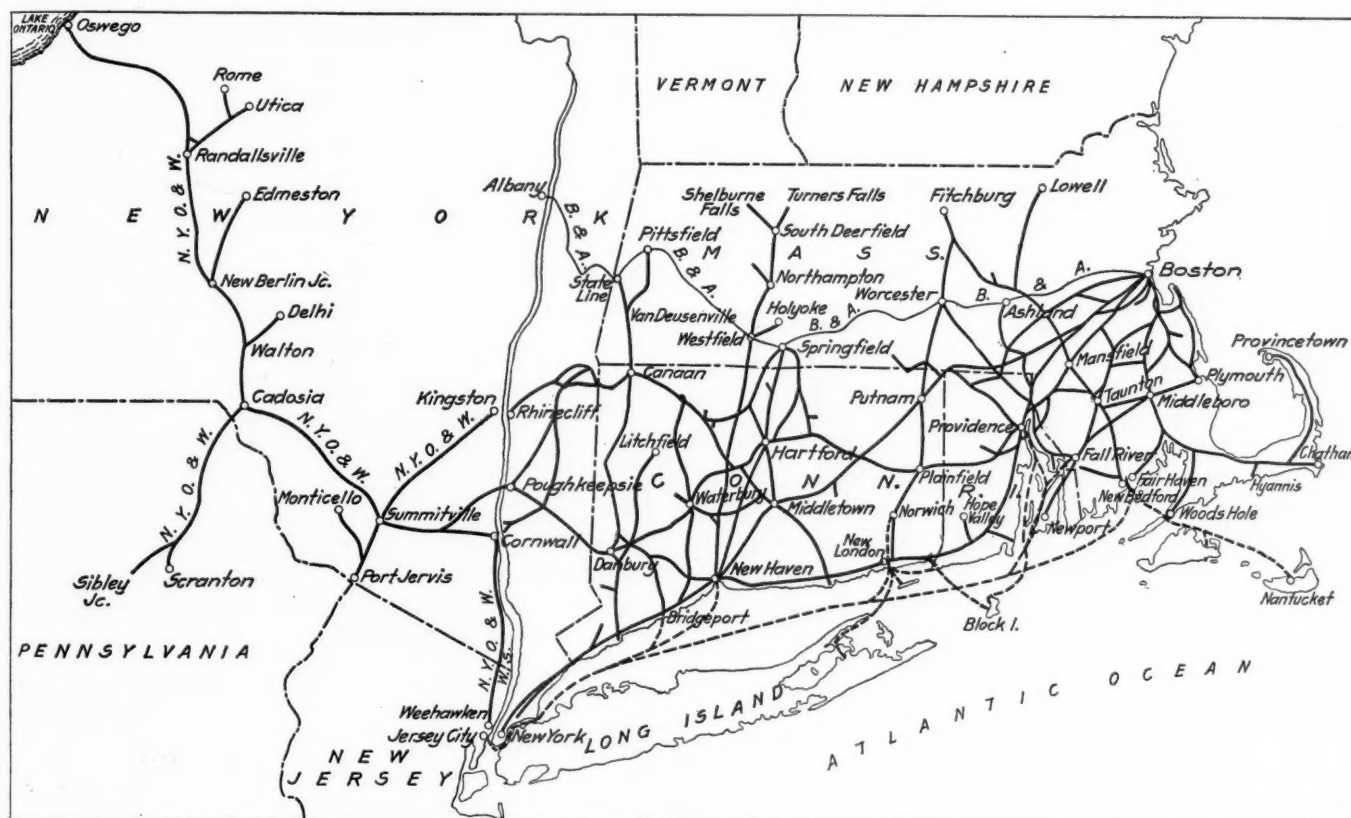
Central; but the three items which are shown are typical. Station employees and expenses are high on the New Haven because there is a very large number of stations per train mile. It may be possible to effect some slight economies; but here is a good instance in which at first glance one might say that the economy of the road was poor, where as a matter of fact the service which the New Haven renders precludes the possibilities of any great economy along these lines.

As to the difference in cost per train mile of road trainmen, the east end of the New Haven is one big classification yard and calls for a large number of short runs, so that the company does not get its full quota of mileage per crew. The average haul on the New York Central for freight was 199 miles in 1912, and on the New Haven, 95 miles. It is safe to say that every ton of freight on the New Haven was handled through a terminal twice to one handling on the New York Central.

The fact that of the total tonnage carried by the New York Central 45.73 per cent. was products of mines and 30.24 per cent. merchandise and miscellaneous, while on the New Haven 31.70

may show a savings in transportation expenses, at least per train mile.

The freight train load on the New Haven is low, 291 tons in 1913, or slightly less than in 1912. The New York Central's train load in 1913 of revenue freight was 465 tons. If we could, therefore, compare transportation expenses per ton per mile on the New Haven and on the New York Central, the New Haven showing would be still worse. New Haven's small average train load, however, is due in some part to conditions which the New York Central does not have to meet. The New Haven's passenger density on its main lines is so great that freight trains have necessarily to be run on a very fast schedule to keep out of the way of passenger trains, and this is prohibitive of heavy loading. On the other hand, on its branch lines—and from the map it is apparent what a mass of these branch lines there are—freight trains have to be run on a schedule to meet the requirements of shippers; in other words, trains have to be run whether or not there is lading for them, and while both of these conditions apply to some extent on the New York Central—and



The New York, New Haven & Hartford System.

per cent. was products of mines and 52.24 per cent. merchandise and miscellaneous, is also instructive.

The difference in cost of fuel on the New Haven and the New York Central accounts for almost all, if not quite all, of the difference in fuel costs per train mile. Coal costs in the neighborhood of \$1.75 to \$2 on the New York Central and \$2.50 on the New Haven.

When we analyze each of the various classes of transportation expenses and study conditions under which these expenses are incurred, it is easy to find an explanation of nearly all of the differences that exist between New Haven and New York Central train mile cost. It is not, however, so easy to suggest what line of attack the management will take in attempting to hold down or reduce expenses. For instance, it is true that the New Haven has a great number of short runs which are expensive both in fuel and in wages of trainmen; but if Mr. Hustis' work on the Boston & Albany can be taken as an indication of what may be expected on the New Haven, it is fair to believe that a few years

this is the reason why the N. Y. C. is used for comparison—they do not apply by any means to as great an extent as on the New Haven.

Here is a tremendously complicated situation that needs study and supervision by those having full authority. If we may judge by some of the testimony before the Interstate Commerce Commission in its recent investigation of New Haven affairs, high authority and personal supervision did not go hand in hand. The result of this, together with the bitter criticisms that have been made against the New Haven management, have tended naturally to weaken discipline and to demoralize the organization and the authority of officers over employees. To overcome this will take patience and courage, but, above all, backbone bred of a knowledge that the policy pursued is one founded on principle, and not expediency, and fair dealing. Luckily for the New Haven, this latter quality has been peculiarly characteristic of Mr. Hustis in his work on the Boston & Albany.

The New Haven property as a railroad property has tre-

mendous possibilities. The total road operated in 1913 was 2,114 miles, with 901 miles of second track and about 130 miles each of third and fourth track with nearly 1,500 miles of sidings. The main four-track line from Woodlawn Junction, just outside of New York City, to Stamford, Conn., 21.67 miles, has been operated by electricity since and the greater part of electrifying the line as far as New Haven has been completed, and it is expected that electrical operation will begin during the present fiscal year. In 1913 the New Haven carried 26,300,000 tons, the average haul being 96 miles; and 86,800,000 passengers, the average passenger journey being 19 miles. The New Haven, being very largely an originating road, gets a generally fair division of rates, and the average ton mile rate for freight is higher than almost any other road in the East. In 1913 the average ton mile rate was 1.345 cents, which was slightly less than in 1912. The average receipts per passenger mile are, as would be expected with its large suburban and commuters' business, low, being 1.737 cents.

The New Haven is and has been a well maintained property. The expenditure per track mile (two miles of sidings being taken as equal to one mile of track in main line or branches) in 1913 was \$2,002. The repairs, exclusive of renewals and depreciation, per locomotive in 1913 was \$2,303; per passenger train car, \$565; per freight train car, \$61.

The New Haven has no very heavy power, of course, because with the fast schedules for freight, heavy power would be a hindrance rather than a help, and a comparatively light passenger locomotive can pull 10 or 11 cars between New York and Boston. On the main line out of New York 100-lb. rail, screw spikes and treated ties are standard, and in 1913, 13,241 tons of 100-lb. rail were laid.

The immediate financial standing of the New Haven is, of course, complicated by the problem of subsidiary companies. The principal of these companies are the Boston Railroad Holding Company, through which the New Haven owns a majority of the stock of the Boston & Maine, the Holding company's stock being carried on the New Haven's books at \$27,600,000; the New England Navigation, Company, which company owns or leases the sound and coastwise water lines, and whose stock is carried on the New Haven books at \$56,900,000; the New York, Ontario & Western, the majority stock of which is owned by the New Haven, which stock is carried on the New Haven's books at \$13,100,000; the New York, Westchester & Boston, the stock of which is carried on the New Haven's books at \$6,240,000 and its bonds at \$2,000,000, but for which the New Haven has also guaranteed interest on \$19,200,000 bonds and to which the New Haven has made advances; the Rock Island Company, a trolley holding company, the stock of which is carried on the New Haven's books at \$24,350,000. This gives some idea of how involved is the question of disposing of these assets and the consequent reconstruction of the New Haven's balance sheet. The balance sheet of the railroad company at the end of 1913 showed \$12,280,000 cash on hand, with \$42,600,000 loans and bills payable. The Massachusetts railroad commission has just approved of an issue of \$67,500,000 6 per cent. convertible debentures, and these debentures are being offered to stockholders at par. New Haven stock until a very few years ago was considered as essentially an investment stock and sold at prices, when paying 8 per cent. dividends, to yield the investor 2, 4 and 5 per cent. In the latter part of the present year the directors reduced the annual rate from 8 per cent. to 6 per cent., and Mr. Elliott's frank statement to the stockholders at the annual meeting a few days ago apparently foreshadows a further reduction to 4 per cent. Even with 4 per cent. dividends at the present market price of the stock it would yield about 5 per cent.

Involved as has been the financing of the New Haven in regard to the purchase of subsidiaries, etc., the parent company's issues of securities, exclusive of its guarantees, has been on a sound basis. At the end of 1913 there was about \$180,000,000 outstanding stock and \$203,000,000 outstanding debt. Of this debt \$143,070,000 are simply debentures, without mortgage lien,

upon specific property, and \$48,790,000 of these debentures are convertible into stock.

The following table shows the principal results of operation of the railroad company for the fiscal year ended June 30, 1913, as compared with 1912:

	1913.	1912.
Mileage operated.....	2,114	2,114
Freight revenue .....	\$34,071,975	\$31,654,186
Passenger revenue .....	27,896,300	26,816,435
Total operating revenues.....	68,613,503	64,456,358
Maint. of way and structures....	7,893,090	6,745,883
Maint. of equipment.....	9,660,669	7,983,858
Traffic expenses .....	582,310	412,880
Transportation expenses .....	27,203,271	24,833,726
General expenses .....	1,947,999	1,650,965
Total operating expenses.....	47,227,339	41,627,312
Taxes .....	3,714,756	3,719,548
Operating income .....	18,316,855	20,497,654
Gross income .....	28,380,640	30,800,762
Net income .....	8,922,238	13,385,551
Dividends .....	13,486,563	14,315,540
Deficit .....	4,564,325	929,989

#### NEW BOOKS.

*Commission Regulation of Public Utilities.* Compiled and published by the National Civic Federation Department on Regulation of Interstate and Municipal Utilities. Distributed by the Traffic Service Bureau, Chicago. 1,284 pages; 6 in. x 9 in.; cloth. Price \$8.50.

This is a compilation and analysis of the laws of 43 states and of the federal government for the regulation by central commissions of railways and other public utilities, prepared as a part of an investigation of public utility regulation begun in February, 1912, under the direction of the executive council of the department on regulation of interstate and municipalities of the National Civic Federation, of which Emerson McMillin is chairman. Commission regulation being the object of the investigation the field was limited to commission jurisdictions, the laws of states that have no commission being omitted from the analysis. However, while the special purpose for which it was prepared has tended throughout to narrow the scope of the compilation, the ultimate value of the work for general use has prompted liberal treatment of most topics, and within its scope the analysis of laws is practically complete. Analogous material from each of the different jurisdictions relating to some 300 different topics has been brought together and edited on a uniform basis, with elaborate indexes and cross-references, and liberal use has been made of the large mass of statutory provisions for the proper enforcement of which authority is conferred upon commissions without having been made integral parts of the commission laws. The compilation is grouped under chapters as follows: Organization of Commissions, General Powers of Commissions, Basis of Rate Making, Establishment and Change of Rates, Publicity of Rates, Discrimination in Rates, and Service, Service, Safety of Operation, Accounts, Reports, Franchises, Stock and Bond Issues, Intercompany Relations, Commission Procedure and Practice, and Enforcement, and the material under topics and sub-topics in each chapter is displayed by jurisdictions in alphabetical order. The work appears to have been most carefully done, and the result should be of value to lawyers, students of regulation, and to all who are interested in the work of the various regulating commissions.

*Railway Track Handbook.* Bound in leather, 124 pages, 4 in. x 6½ in., illustrated. Edited by Bruce V. Crandall. Published by the Spencer, Otis Company, Chicago, New York and St. Louis.

This book contains a large amount of data regarding the amount of rail splices, bolts and other material required for a given length of track with costs. The current prices of track and much other material required in maintenance work are given in detail with the amounts required for given units of work. The book is prepared in an attractive manner and should be of value for reference in estimating the cost of work.



# STEEL PASSENGER TRAIN CAR SITUATION.

Frank Discussion of Various Features Which May Affect the  
Extent and Rate at Which Such Cars Will Be Introduced.

Several bills looking toward the compulsory introduction of steel passenger train cars within limited periods, have been introduced in the Sixty-third Congress. Representative Raymond B. Stevens of New Hampshire, chairman of a sub-committee of the House Committee on Interstate and Foreign Commerce appointed to deal with railway regulation, was reported recently to have said that the steel car problem "should be solved by a small body of experts who are making a life study of it, rather than by 435 members of Congress who know nothing about the subject technically. The way to deal with the problem is to turn the whole question over to the Commission, with power to act when occasion demands."

## WHAT ACTION SHOULD CONGRESS TAKE?

The main purpose of this article is to set forth reasons why governmental action in this matter, if any is to be taken, should be delegated, as urged by Representative Stevens, to the Interstate Commerce Commission and not dealt with in detail by statute. In support of this view four principal reasons may be given:

(1) The railroads already have practically ceased ordering wooden cars. The percentage of new wooden passenger train cars placed in service has dropped from 51.4 during 1909 to 3.3 during that part of 1913 thus far reported. During the first six months of 1913 no wooden cars were ordered. No drastic mandatory statute is called for when those affected are already doing voluntarily what is sought.

(2) It is out of the question to draw a bill fixing a time within which the change to steel cars must be completed, because nobody knows what the car building capacity of

the country is going to be. Existing plants would require at least ten years to supply steel cars to replace the wooden ones, and experience alone can tell to what extent private capital will invest in new shops and shop extensions.

(3) Only 3.1 per cent. of those killed and 21.2 per cent. of those injured in accidents on American railways in 1910 were passengers. Safety measures other than steel cars are evidently needed. A mandatory statute compelling the expenditure necessary for specific provision of steel cars of a stated type within a definite period in all passenger trains might absorb so much money for that purpose as to force neglect of other improvements, more important in the interest of safety than steel cars.

(4) Nobody can draw a bill specifying the type of car which will best insure safety, because expert opinion still differs as to the respective merits of all-steel, steel frame and steel underframe construction, and other important details involving both safety and cost.

## RAILROADS HAVE ALREADY ADOPTED STEEL CARS.

On January 1, 1913, according to Bulletin 53 of the Special Committee on Relations of Railway Operation to Legislation, there were on 247 railroads in the United States, owning 57,493 passenger train cars and operating 227,754 miles, a total of 7,271 all-steel cars, 3,296 steel underframe cars and 46,926 wooden cars. The rapid rate at which all-steel cars have been

placed in service during the past few years is shown by the following table, which is taken from that bulletin:

	Total Number.	Percentages.		
		Steel.	Steel Under- frame.	Wood.
1909 .....	1,880	26.0	22.6	51.4
1910 .....	3,638	55.4	14.8	29.8
1911 .....	3,756	59.0	20.3	20.7
1912 .....	2,660	68.7	20.9	10.4
January, 1913 (under construction) ..	1,649	85.2	11.5	3.3

For the first six months of 1913 orders were placed by the roads included in the above report for 1,140 passenger train cars, of which 1,064, or 93.3 per cent., were of all-steel construction, and 76, or 6.7 per cent., had steel underframes. No wooden cars were ordered.

## WHY THEY WERE INTRODUCED.

While the extensive use of metal for passenger car construction was considered as early as 1854, it was not until about 40 years later it began to receive serious consideration. According to a committee on Steel Passenger Cars, which reported at

the 1908 meeting of the Master Car Builders' Association, the most important reasons which brought the desirability of introducing steel passenger cars prominently before the railroads were:

(1) The burning of wooden cars in wrecks, and the frequent destruction of human life by fire.

(2) The splintering of the large wooden sills, etc., when the cars were wrecked, causing injury and death.

(3) The scarcity of lumber suitable for sills, stringers, etc., and the threatened exhaustion of such material.

(4) In collision with steel freight cars, which were being introduced in great numbers, the passenger equipment was more liable to destruction than was the case with the wooden freight cars.

(5) Increased speeds, greater train lengths, and larger capacity cars.

Then too, the rapidly increasing use of electric motor cars in subway and elevated service, where the passengers cannot easily leave the cars in case of accident, and the danger from fire where electric power is used, suggested the use of non-inflammable materials in the construction of these cars. This was undoubtedly largely responsible for the development of the all-steel passenger train car, as indicated in the brief sketch of the early stages of the introduction in another section of this article.

The movement received its great impetus in the East because of the electrification of the steam roads entering New York City and the possible dangers if wooden equipment were to be used in connection with the use of electric power in the long tunnels. In the West, on the Harriman Lines, steel cars were introduced because of the belief that they would prove safer and more economical to maintain than wooden equipment.

The publicity departments of the roads which first started to introduce the steel equipment were not slow to realize the advertising value of having all-steel cars on their limited trains, and this undoubtedly had some considerable influence in in-

## Synopsis.

*What Action Should Congress Take?*

*Railroads Have Already Adopted Steel Cars.*

*Why They Were Introduced.*

*Rapid Development of Steel Cars.*

*How Fast Can Steel Cars Be Built?*

*What Will It Cost?*

*Steel Frame vs. All-Steel Cars.*

*Are Steel Cars Needed?*

*Behavior of Steel Cars in Wrecks.*

*Views of the Interstate Commerce Commission.*

*Conclusions.*

ducing the other roads, particularly those in competitive territory, to adopt such equipment for their better class trains.

#### RAPID DEVELOPMENT OF STEEL CARS.

The first steps in the progress of the introduction of steel passenger train cars were outlined in an editorial on the "Rapid Increase of Steel Passenger Equipment" in the *Railway Age Gazette* of August 15, 1913, page 257. The steel frame, side door suburban cars used by the Illinois Central to handle the World's Fair traffic in 1893 are generally regarded as the forerunners of the all-steel passenger car in this country. In the same year the Pressed Steel Car Company built 35 steel underframe cars for the Northwestern Elevated of Chicago. Then followed a steel frame car for the Interborough Rapid Transit Company of New York, a steel car on the Second Avenue Elevated Line in 1904, and the building of 300 all-steel cars for the New York subway in the same year. A steel baggage car was put in service on the Erie in 1904. In the winter of 1904-5 the Long Island introduced 134 steel suburban cars in its electric service, and the Erie added a steel postal car and a steel express car to its equipment. In 1906 the New York Central put in service 125 steel motor cars (these were the first cars built of steel along the lines of a modern steel coach), the New Haven two steel postal cars, the Long Island an all-steel passenger coach, while both the Pennsylvania and the Southern Pacific built experimental all-steel passenger coaches for through traffic. The Pennsylvania also introduced a steel baggage car late in the year.

The year 1907 marked the introduction of a steel postal car on the Southern Pacific, the building of a steel Pullman car, 40 steel passenger cars for the Hudson & Manhattan, a steel postal car and a passenger coach on the Union Pacific, five steel postal cars and a steel passenger car on the Pennsylvania, and 50 more all-steel cars for the Interborough.

The M. C. B. report at the 1908 convention showed that there were about 380 all-steel cars in service or under construction for steam roads at that time, and commented on the fact that the greatest development was shown in the East because of the desirability of having fireproof cars for use on the electrified portions of the roads entering New York City, with their long tunnels. By January 1, 1909, there were 629 all-steel and 673 steel underframe cars in service in this country.

#### HOW FAST CAN STEEL CARS BE BUILT?

Records in the annual statistical numbers of the *Railway Age Gazette* show that for the past five calendar years a little more than 16,000 passenger train cars—wood, steel underframe and all-steel—were built for use in the United States. This is at the rate of about 3,200 a year. There is some little difference of opinion as to just how many all-steel passenger cars it would be possible to build per year. Two of the large builders estimate that with present facilities 3,500 such cars could be built each year; a canvass made by the Committee on Relations of Railway Operation to Legislation indicates that the maximum number of all-steel cars which can be built at the present time is about 4,630 per year. One builder is authority for the statement that about 5,000 can be built if some of the steel freight car shops can be fitted with equipment for handling steel passenger cars. This might be all right when orders for freight equipment are scarce, as at present, but this business is bound to pick up and require all the building facilities which are available.

In the investigation by the Interstate Commerce Commission of the North Haven wreck, General Manager Dean, of the Pullman Company, furnished the following information as to the annual maximum capacity of the various car building plants in the country, based upon being able to secure an adequate supply of the necessary material and labor:

American Car & Foundry Company:	
Jeffersonville, Ind. ....	300
St. Charles, Mo. ....	480
Berwick, Pa. ....	600
Wilmington, Del. ....	300
	<hr/> 1,680

Standard Steel Car Company, Pittsburgh, Pa.; plants at Butler, Pa., New Castle, Pa., and Hammond, Ind. ....	420
Pressed Steel Car Company, McKees Rocks and Pittsburgh, Pa. ....	360
Barney & Smith Car Company, Dayton, Ohio. ....	420
Harlan & Hollingsworth Corporation, Wilmington, Del. ....	250
Wason Car Company, Springfield, Mass. ....	180
Laconia Car Company, Laconia, N. H. ....	120
The Pullman Company, Pullman, Ill.: Passenger equipment .....	1,200
Pullman cars .....	600
	<hr/> 1,800
Total .....	5,230

It will be necessary to provide about 47,000 cars, if all the wooden and composite cars are to be replaced. Making no allowance for additional equipment required for increased traffic and new lines, at least ten years would be required for building this equipment, assuming that the project could be financed, that the builders would increase their facilities to take care of the business, and that labor conditions would allow them to secure a maximum output. On the basis of the past year's output this latter assumption is rather wide of the mark.

#### WHAT WILL IT COST?

Various estimates have been made as to the probable cost of replacing the passenger cars with those of all-steel construction. Probably the most accurate of these is that made by the Special Committee on Relations of Railway Operation to Legislation in its Bulletin 53. It is estimated that \$614,619,100 will be required for replacing 46,926 cars, but that this is made on a conservative basis is indicated by the fact that the average cost for the 23,692 passenger coaches is placed at only \$12,800. A steel car designer of some considerable experience estimates that steel passenger train cars can be built for about 12 cents per pound, as compared to about 2½ cents for freight cars. On this basis the Pennsylvania steel coaches, designed to seat 88 people, would cost about \$14,000. One steel car builder is authority for the statement that all-steel passenger coaches cost from \$14,000 to \$17,000 each, averaging about \$15,000. In the Interstate Commerce Commission hearing on the North Haven wreck General Manager Bardo submitted a list of improvements which the New Haven had made or authorized since August, 1911, in which 100 steel passenger coaches were listed at \$16,500 apiece.

If the roads could get together and order common standard cars the price might be made lower. The term common standard in this case does not refer alone to the type of framing and superstructure, but to the specialties as well. Builders experience serious trouble and delays, even if the general construction is similar, if a few of the specialties vary. This is evident in the experience of one important system which is now having built a large number of steel passenger coaches, which are almost identical except for certain specialties which are varied to suit the tastes and special requirements of different parts of the system. These changes, unimportant as they may seem, interfere with the output to a considerable extent, and particularly, when due to the delivery requirements, it becomes necessary to build the cars in small lots for each of the various divisions, instead of running all the cars for one division through at one time.

Builders will probably not allow the passenger car business to interfere with the building of freight cars. Building passenger cars is a slow process, and it is commonly reported that it is not nearly so profitable as the building of freight cars of an equivalent value. Whether they would care to extend their facilities at the expense of the freight car business or whether they could afford to greatly extend their steel passenger car building facilities is an open question. To build a new plant and install an efficient organization is a matter of at least a couple of years, and it is doubtful whether capital could be interested in such a hazardous venture, when the fluctuations in the railway supply business are considered.

#### STEEL FRAME VS. ALL-STEEL CARS.

Fire and splinters are the two great objections to the wooden cars in case of wreck. These are reduced somewhat with the



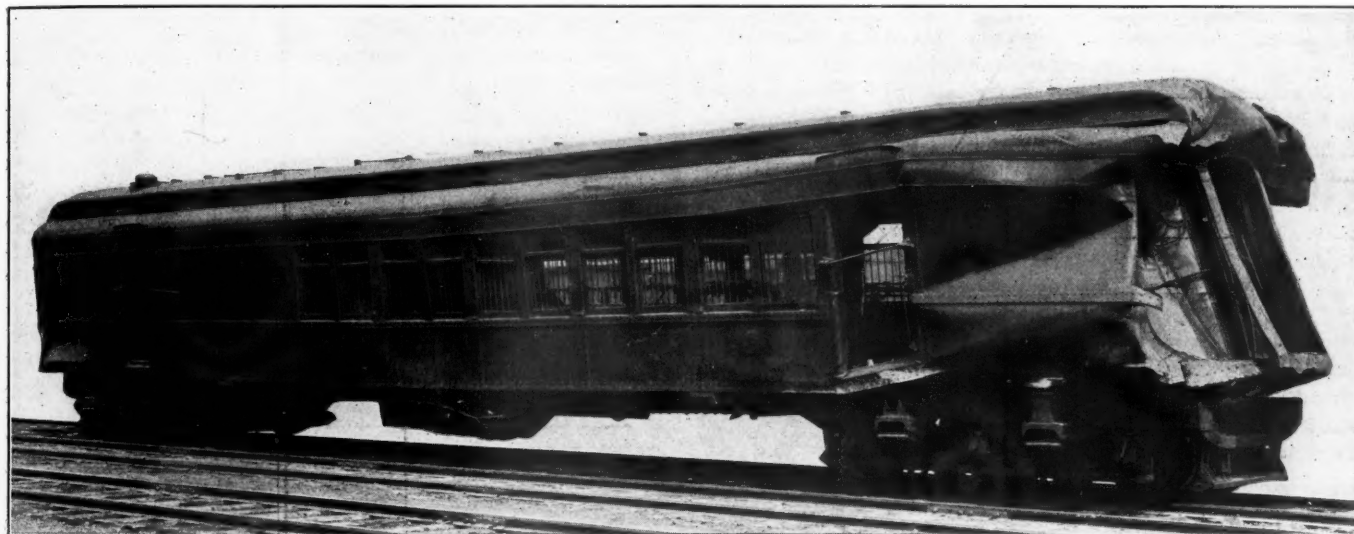
steel underframe car, and still more so with the steel frame car, which includes a steel underframe and a steel frame for the superstructure. This is particularly true of splinters, which are not nearly so serious where the heavy framing timbers are replaced by steel members.

One system which has a large number of steel frame passenger cars in service claims that this type "is very much superior to a large proportion of the steel equipment now being turned out, due to being lighter than steel and, also, to the fact that steel sheathing in itself is a safeguard only against fire and is not as good a protection, in the case of most of the accidents that happen on railroads, as steel underframes and framing properly designed. Our investigation indicates that steel equipment will be at least 20 per cent. heavier than coaches built to our present design. We have felt that the danger of fire from the locomotive can be largely eliminated by the use of steel mail cars which are placed next to the engine." The statement that steel equipment will be at least 20 per cent. heavier is questionable. The Pennsylvania, Oregon-Washington & Navigation Company, and the Southern Pacific passenger

and a better insulator. Probably on no question in passenger car design is opinion so divided amongst both railroad and car builders. There is today very little difference in cost, and it certainly appears probable that in the future the tendency will be to adopt steel interior finish if not entirely, at any rate to a great extent."

W. F. Kiesel, Jr., assistant mechanical engineer of the Pennsylvania, in speaking on this subject at the same meeting, said: "In the all-steel car the steel lining can be securely riveted to the framing and adds somewhat to the strength of the complete structure, but as steel is a good conductor, it carries away the heat of a body coming in contact with it, and, therefore, will always feel cold, even when the temperature in the car is sufficiently high. Satisfactory results have been realized from the use of a double steel lining between seats, forming a hot-air duct, extending from the heater pipes to the window sill, with outlet through small holes in the lining proper, located immediately below the window sill.

"Wood lining requires considerable wood furring, and adds weight to the car without adding to the strength. As the steel



The Crushing of the End of this Steel Car Absorbed the Shock and Protected the Body of the Car.

coaches have a dead weight per passenger of less than 1,400 lbs. It is doubtful if the first class wooden coaches which they replaced weighed much less than this. On the other hand many all-steel coaches are in use on other roads which have a dead weight of more than 1,700 lbs. per passenger. The extensive use of electric lighted cars also minimizes the fire risk.

President George F. Baer, of the Philadelphia & Reading, was widely reported to have made the following statement a short time ago: "By discipline—firm, rigid, unyielding discipline—alone can railroad wrecks be averted. I do not believe in all-steel cars. I think the half-steel cars are the safest. But steel cars will not prevent wrecks. Discipline alone can do that." This report as far as it refers to steel and part-steel cars is erroneous. The Reading has cars of steel construction in use and has others on order. True, these cars have an inside wooden lining, but this is used because it gives a more pleasing finish to the cars, does not affect their strength in the least, and is considered practically as safe as the all-steel construction. Many cars, classed as all-steel, are finished in this way.

Referring to the matter of inside finish for all-steel cars, H. H. Vaughan, assistant to the vice-president of the Canadian Pacific, in addressing a New York meeting of the American Society of Mechanical Engineers, April 8, 1913, said: "The preferable material for inside finish is a matter for future decision. With the ample protection afforded by a steel car against accident, there does not appear to be any objection to wood inside finish on the ground of safety. It is more ornamental than steel

frame of a long passenger car may vary as much as  $\frac{1}{2}$  in. between extremes of temperature it is necessary to make allowance in the construction of the wood lining for this variation in length. As a car with metal lining riveted to the framing has the advantage in strength, weight, and cost, it will gain in favor; in fact, it would be at present universally preferred if all railroad shops had practical experience with steel lining, and the necessary proficiency and machinery for its manufacture."

The following expression of opinion concerning the use of all-steel and steel underframe cars [not steel frame] is taken from the report of the New York Public Service Commission, Second District, on the Delaware, Lackawanna & Western rear-end collision at Corning, N. Y., on July 4, 1912: "Steel cars certainly appear to afford additional protection to life in accidents of this character, but there is room for discussion of their value as compared with wooden cars having steel underframes. Further and exhaustive examination of this matter is imperatively demanded. A large amount of progressive work has been done in this country in the construction of wooden cars, through close coupling vestibules and strong platforms, to reduce the danger in collision or derailment. The construction of American wooden cars appears to be far superior in safety to the passenger cars used in England or in Europe generally, and the efforts to afford safety and comfort in the car construction of this country as compared with foreign practice is indicated by the great weight of American equipment in pro-

portion to passengers carried. The indications are, we think, that the use of steel cars will increase rapidly in this state through the ordinary processes of addition and replacement, and through the necessities of electric operation in tunnels such as those at New York."

H. H. Vaughan, in speaking before a New York meeting of the American Society of Mechanical Engineers on April 8, 1913, said: "The steel underframe does not appear to be a satisfactory or permanent development. There is but little saving either in weight or cost over the all-steel construction, and it is difficult to see how the same strength in case of accident can be obtained. Experience will show whether the wood superstructure can be secured in such a way as to prevent working as the car gets old, but as it cannot be arranged to carry any weight, this appears questionable. It can hardly be regarded except as an intermediate step between all-wood and all-steel construction."

In the Interstate Commerce Commission hearing on the North Haven wreck General Manager Dean of the Pullman Company stated that the first all-steel Pullman cars were completed in February, 1910. He also stated that the all-steel car was unquestionably stronger than cars of other types and with the all-steel car properly reinforced at the end it is the most advanced type of car manufactured at the present time. In his opinion, the steel underframe car having wooden posts was not as strong or as safe as the all-steel car with steel posts, due to danger in collision of a car overriding the steel underframe and telescoping the car body.

There seems to be a considerable difference of opinion as to the relative weight and cost of steel and wooden cars. Mr. Vaughan, in referring to the weight, said: "With equal strength of side framing the side-girder car may be made lighter than the center-girder type, and the weight of steel passenger cars is one of the most serious problems to be faced by any railroad not having a level line. American passenger equipment was already excessively heavy per passenger carried with wood construction, and the use of steel has increased this weight from 10 per cent. to 20 per cent., which is a most serious matter. Apparently side-girder cars as so far constructed have a decided advantage over the center-girder type in their light weight and greater strength in case of accident tending to crush in the side of the car. This will probably lead to the use of this type on roads on which weight is of importance."

The claim is made by some designers that a steel underframe car, compared to an all-steel car of equal strength, is heavier and will cost as much or more than the steel car. It should be noted that Mr. Vaughan compares the all-steel car with the wooden one, and not with the steel underframe car. In speaking of the comparative cost of steel and wood cars W. F. Kiesel, Jr., assistant mechanical engineer of the Pennsylvania Railroad, said: "Those who have been in close touch with the development of the steel car industry know that at the present time steel cars cost and weigh no more than equivalent wood cars."

While the Interstate Commerce Commission has made several recommendations as to the use of steel cars, it has nowhere defined the meaning of that term. Steel underframes and steel frame cars both have strong advocates. A study of the reports of wrecks made by the Interstate Commerce Commission indicates that steel underframe cars have given a good account of themselves. The difficulty with this construction, as suggested by Mr. Vaughan, is properly to tie the superstructure to the underframe. With a steel underframe and a reinforced end construction, however, such cars are probably as safe from telescoping as some of the steel cars which have been built. The elimination of the heavy wooden sills reduces the risk from splinters to a great extent.

On the other hand, the steel frame car will undoubtedly be classed as a steel car, for with its steel framework, and proper attention to the construction of the hoods and end frame to

prevent telescoping it can be made of sufficient strength to insure safety, the danger from splinters will be practically eliminated, and the risk from fire will be greatly reduced.

#### ARE STEEL CARS NEEDED?

While steel passenger train cars may be desirable from many points of view, there is a considerable question in the minds of many as to the advisability of unnecessarily expending money for them when it might far better be spent in other ways which will go to the very root of things and eliminate the causes which are responsible for the accidents. After all, the number of lives that may be saved by the use of such equipment is only an extremely small percentage of the lives lost annually on railroads. For instance, for the year ended June 30, 1912, 318 passengers were killed and 16,386 injured, while 3,235 employees were killed and 50,079 injured, and 6,632 other persons were killed and 10,710 injured. Only 3.1 per cent. of those killed and 21.2 per cent. of those injured were passengers, and this is the class to which the introduction of steel cars will be of greatest benefit. Furthermore, less than one-half of the passengers killed were in collisions or derailments. The others were killed or injured largely because of want of care on the part of the victims themselves.

Many roads are now using all-steel cars on their high grade passenger trains. The railroads generally have practically stopped building wooden cars, none having been ordered during the first six months of the present year. Although the first experimental passenger coaches for steam roads were not built until 1906, and it was not until the middle of 1907 that the Pennsylvania Railroad placed the first large order for such cars, on January 1, 1913, over 12.6 per cent. of the cars on roads covered by Bulletin 53 of the Special Committee on Relations of Railroad Operation to Legislation were all-steel and 4.6 per cent. were steel underframe construction. Surely this indicates a purpose on the part of the railways to take full advantage of this construction, particularly when we consider that it is still considered by some to be in an experimental stage, and that until comparatively recently we have had no idea as to how it would behave in wrecks. Even today our knowledge in this respect is very limited.

If laws are to be enacted forcing the roads to equip with steel passenger cars, it would hardly seem necessary, or even advisable in many cases, to require such cars except on roads or divisions where the traffic is heavy and is operated at high speed. Where trains are operated at slow speed, or are few in number and small, as they are on many roads or on some divisions and branches of large systems, it is useless to require all-steel cars. The money could be far better spent in providing safeguards to prevent accidents. The better class wood cars now in service could be used in these cases until it became necessary to replace them, or until such a time as the traffic increased to a point where it became advisable to transfer or take them out of service.

It must be ever kept in mind that steel cars will not prevent wrecks. The *Literary Digest* stated the case aptly in its issue of October 4, when it said: "As no wreck was ever prevented by steel cars, some observers are asking just now if the popular craze for these vehicles would not be better directed toward the elimination of causes of accident, instead of taking it for granted that every train will some day go to smash, and building it like a safe-deposit vault. One editor inquires if it wouldn't be better to insist that there be no collisions of trains of whatever material rather than to rest content with steel cars to make collisions perfectly safe and customary."

The New York Public Service Commission, Second District, in commenting on the cost of replacing wooden cars by those of all-steel construction, said in its report on the Corning, N. Y., accident: "The enormous cost which would be required to replace the present equipment of wooden cars in advance of the natural movement in that direction, coupled as it would be



more or less with a diversion of funds needed for the prevention of accidents, to a purpose that only minimizes the effect of accidents which ought not to have occurred, is one of the considerations to be given proper weight in the study and investigation which we strongly favor."

It is a matter of common knowledge that the managers of most of the large railways would today appropriate many millions of dollars for automatic block signals, now generally acknowledged to be one of the most important instrumentalities in the prevention of collisions, if they knew how to raise the necessary money. Ten thousand miles of track need this improvement today.

Many millions are needed on every road for the elimination of grade crossings of highways. This is a matter in which the public is vitally interested, and yet when a railway makes an investment of this kind there is no increase in its receipts and little or none in the net results. In spite of the financial difficulties cities and towns are constantly forcing these expenditures on the railways. There are many other expenditures which are much more needed in the interests of safety than that for steel passenger train equipment.



Showing How the End of the Steel Parlor Car Was Crushed in at the Tyrone, Pa., Wreck.

The report of the Rail and Equipment Committee of the National Association of Railway Commissioners contained this statement: "It must be acknowledged that the wheel weights now being used upon both cars and locomotives in the United States are so great as to be entirely without precedent in railroad history, and the combination of speed and heavy wheel weights, together with the extremely severe track conditions frequently met in winter operations in this country, produce conditions which are most difficult to meet."

#### BEHAVIOR OF STEEL CARS IN WRECKS.

Steel passenger train cars have given a good account of themselves in wrecks. The conditions under which collisions and derailments take place vary so widely, however, that it is difficult to secure a fair comparison of the behavior of wood,

as compared to steel cars. Three wrecks have occurred within the past six months which may prove of interest as affording such comparisons.

H. W. Belnap, chief inspector of safety appliances, in his report of a head-end collision between two passenger trains on the Missouri Pacific at Brant, Mo., May 27, 1913, said: "This accident affords exceptionally interesting opportunity for comparison between wooden and steel equipment. Both trains were traveling at about the same rate of speed, and one had a wooden car immediately behind the locomotive, while the other had a steel car in a similar position. The wooden car was completely wrecked and was destroyed by fire which broke out afterwards, while the steel car was badly damaged only on the end adjoining the locomotive, even the window glass in the other part of the car not being broken; all this notwithstanding the fact that the steel car had the weight of six cars behind it, while the wooden car had the weight of only four cars."

Within the past four months two wrecks have occurred, one with wooden cars and the other with steel cars, in which the conditions were quite similar. In discussing the New York, New Haven & Hartford rear-end collision at North Haven, Conn., on September 2, 1913, the Interstate Commerce Commission report contains this statement: "It is interesting, however, to note the contrast between the condition of the wooden cars involved in this accident and the steel cars involved in a similar collision on the Pennsylvania Railroad at Tyrone, Pa., on July 30, 1913. In each case the speed of the approaching train is thought to have been about 40 miles per hour. In the Tyrone accident the train which was struck had just started from the station but had moved only about one car length, while in this accident the train which was struck was standing still. In this accident the two rear cars were completely demolished, the third car badly damaged, and 21 passengers killed. In the Tyrone accident, however, none of the cars were destroyed, although several were quite badly damaged on the ends, and none of the passengers were killed. The shock of the collision was absorbed by the crushing of the platforms and vestibules."

The Tyrone wreck was one of the most severe in which steel cars have been concerned and a study of the behavior of the cars is therefore of special interest. The accompanying photographs show how the ends of the cars were crushed in. A characteristic of the Pennsylvania steel car design is that it is of uniform strength for any cross-section throughout the length of the car. There are strong vertical members at the end to prevent one car from telescoping another, and the roof, in addition to being sufficiently strong to keep from collapsing when it is turned up-side-down, is so braced as to afford considerable resistance to end stresses.

With a construction of this type the car will start to give way at the point of impact, as it would in any other case, but the heavy vertical members and the manner in which they are tied to the framework, together with the roof braces, cause a sort of pulling-in effect, drawing the roof and side framing inward, into the zone where they offer the most resistance, giving the damaged end a "mushroom appearance." While the force of the blow is first communicated to the small areas of the ends which may be in contact, and these parts crumble and give way, it is quickly transmitted to the other parts of the structure which offer more and more resistance as the stress is distributed throughout the whole cross-section, until the force of the blow is entirely absorbed. In other words, the blow is cushioned by offering a yielding resistance sufficient to absorb the shock while the end is giving way, thus protecting the body of the car.

There are other steel car designers whose views differ greatly from those of the Pennsylvania engineers. Their recommendations vary all the way from providing a special collapsible vestibule to absorb the shock and protect the body of the car, to using an extremely heavy end construction. If the cars are made too strong, so that some part will not give way and ab-

sorb the shock, the lives of the passengers will possibly be in as great danger as if the car was too weak. As the car will give way first at the point of impact, it is conceivable that the vestibule could be made considerably stronger than the cross-section through the body of the car, but the difference in strength should not approach the point where the body of the car will be in danger of crushing or crumbling.

Moreover, in designing such cars it is necessary to keep the weight as low as possible, consistent with safety. Otherwise the expense of operating the equipment will prove a burden. There is a considerable variation in the weight per passenger in the different designs of steel cars now in use, and more will have to be known about the behavior of the various types of cars in wrecks before the car which is to be perpetuated can be selected. It is not much of a problem to design a steel passenger train car which will operate safely. It is a tremendous problem to design one which at one and the same time affords ample safety and is the cheapest to operate and maintain; and although the steel passenger car is considered by many to have passed through the experimental stage, we have had such a limited experience with these cars in wrecks that possibly we are taking too much for granted in jumping to this conclusion.

#### VIEWS OF THE INTERSTATE COMMERCE COMMISSION.

The Interstate Commerce Commission, in response to a request from the House Committee on Interstate and Foreign Commerce for its opinion on a bill to require steel passenger cars, expressed itself as follows on June 24, 1911, and it is doubtful if it has had reason to greatly change its opinion since that time: "It is believed that the limit of time within which carriers should be prohibited from bringing into use new cars not in conformity with the provisions of the act should be approximately a year after the passage of the act or possibly a somewhat shorter period. This is suggested for the reason that there are doubtless many orders already placed and contracts in existence for construction.

"It seems to us that the period within which all carriers subject to the act should be required to bring into conformity all of their equipment of the kinds designated with the requirements of the proposed act should be extended somewhat beyond that suggested in the bill, and perhaps ought to be not less than about 10 years from the passage of the act. This suggestion is made because of the knowledge that at the expiration of a shorter period of time there would still be many cars capable of as satisfactory service as they are now, and that to put them out of service altogether in a less period than that suggested would entail a very heavy loss upon the carriers and would deprive them of the use of cars approximately as good as many of their standard cars now in use.

"It is believed that even at the end of the 10-year period suggested there would be many cars available for further valuable service with reasonable safety, especially on minor roads where few and small trains are operated and for short distances. This would be particularly true with respect to cars of special construction and strength, such as Pullman cars. For these reasons it is also believed that the commission should be vested with authority, in the event the bill is enacted into law, to extend the period of time within which particular carriers might continue the use of cars, also the time within which any carrier might be permitted to use particular cars which might at that time be deemed by the commission to be reasonably safe upon such investigation or inquiry as might in its judgment be necessary."

It is interesting to note that within less than 19 months after this expression of opinion the railroads, which furnished data for Bulletin 53 of the Committee on the Relations of Railway Operation to Legislation, had entirely stopped ordering wooden passenger cars.

Chairman Clark, of the Interstate Commerce Commission, in writing to a member of the Committee on Rails and Equipment of the National Association of Railway Commissioners, recently said:

"If a meeting of this committee had been held I am sure I should have been disposed to urge consideration and treatment of the subject of steel cars in the report. Our commission has officially expressed the view that from a given reasonable date, which would permit completion of cars under construction, no new cars should be put in passenger service except all-steel cars, and that from some reasonable later date, no cars, except all-steel cars, should be used in passenger train service.

"Investigations of wrecks which we have conducted have impressed us strongly with the conviction that steel passenger train equipment affords better protection to passengers than has ever been afforded by any other equipment."

#### CONCLUSIONS.

In conclusion it must be admitted that the steel car thus far has shown itself to good advantage in wrecks, although experience in this respect has been very limited and it is not known surely how the different types of construction now in use will compare and which one, if any, should be perpetuated. The steel underframe car, and more particularly the steel frame car, may be made as strong as the all-steel car and, because of their behavior thus far will probably be included under the classification of steel cars, if action is taken to force the railroads to adopt such equipment.

The steel car cannot prevent wrecks and the great expense involved in prematurely replacing wooden equipment with that of steel construction is hardly warranted when we consider other ways in which the money could be spent to better advantage in providing for the safety not only of the passengers, but of employees and others. Meanwhile the roads have shown a disposition to install steel cars as fast as the wooden ones need replacing and under normal conditions, without placing a heavy financial burden on the roads, the greater proportion of passenger train cars, particularly for high speed and heavy traffic, will be changed to steel within a reasonable period, whether action is taken by the government or not.

As public service commissions and regulating bodies have gained in experience and knowledge they have been forced to a realization of the necessity for careful and conservative action in dealing with important problems of this kind which require expert advice and which may affect adversely the interests of every individual in the community if not properly dealt with, and it is not likely that Congress will care to assume the responsibility of drastic action. Chairman Stevens, of the sub-committee of the Committee on Interstate and Foreign Commerce, is putting all the energy and study possible into trying to solve the problem for the best interests of all concerned. It is true that he has been spoken of in his own state as a "railroad baiter," but one knowing the circumstances under which he earned this title must recognize that it is undeserved and that his only concern is to bring about such legislation as will produce the best and most far-reaching results for the country at large and for the railroads, for their interests are the same and the welfare of either one is dependent on the other.

The sub-committee expects to hold hearings on this question at which all parties interested will be given an opportunity to express their views. A hearing had been set for October 16, but it was not possible to secure a quorum of the members of the sub-committee, and it was decided to postpone further hearings until November. Undoubtedly no action will be taken during the present session, although it is quite probable that the committee will attempt to cover the subject thoroughly with a view to making recommendations to be acted upon as early as possible during the regular session, which begins December 1.

CANTON-HANKOW RAILWAY, CHINA.—Survey work was resumed in June last, since when the whole route of the railway has been resurveyed from Wuchang to Yochow, a much better alinement has been obtained, and a saving in length made of slightly more than 11 miles compared with the original survey. The line as finally laid down will pass some 3 miles to the east of Chengling.



## WILLIAM C. BROWN.

At the meeting of the boards of directors of the New York Central & Hudson River, the Lake Shore & Michigan Southern, the Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis on Tuesday afternoon, W. C. Brown tendered his resignation as president of the New York Central lines in the following letter:

"I have for two years contemplated asking to be relieved of the very exacting duties and responsibilities of the position of chief executive of the New York Central lines.

"I have been in railroad service continuously for more than 44 years—12 years of this service with the New York Central lines, five years in charge of operation and maintenance of the property, two years as senior vice-president and five years as president—and I feel that I have earned that freedom from care, hard work and responsibility which can only be secured by retiring from active service.

"In addition to my desire to be relieved of the burden and responsibility of my position, I am admonished by my failing hearing that I cannot, without serious embarrassment, continue to perform the duties of the position, either in the board room or in frequent important conferences in which I must necessarily participate.

"For these reasons, I beg to very respectfully tender my resignation as president, effective January 1, 1914.

"In leaving the service, I desire to express my sincere and grateful appreciation of the cordial co-operation which has always been extended to me by this board, and of the loyal, intelligent, and efficient support and assistance rendered by all the officers of the company."

The board, in accepting Mr. Brown's resignation, adopted the following resolution:

"This board accepts with regret the resignation of President William C. Brown. When he joined our system he had been for 32 years in active railroad work. He had risen from the bottom through every grade of operation and administration to the highest division in the important lines with which he was connected.

"His demonstrated ability as vice-president and general manager of the Lake Shore led to rapid promotion.

"He had won all these positions through a wide and varied experience, hard work, and close study. He was unusually equipped for its great responsibility when he came to be the executive head of this system. He has kept harmony while maintaining discipline and efficiency with this great working force.

"Under his administration the relations have been cordial between the railroad and the people in the territory it serves. The business of the system has doubled in revenues and tonnage. The vast construction and engineering work in the remodeling and remaking of the New York terminal and station has been uninterruptedly carried on, and railway operators at home and from

abroad have expressed their admiration that difficulties have been so overcome that train service has been maintained, that the electrification of the service in and about New York has been carried to completion without delaying or retarding the building of the engineers, architects, and contractors.

"Mr. Brown has been a pioneer in economic experiments for the increase of the output of the farms at the expense of, and under the management of, the railroad company. It brings the railroad and the farmer together for their mutual advantage. At threescore, and after 44 years of unremitting labor in his chosen profession, Mr. Brown has earned the privilege of retirement from the active and exacting responsibilities.

"He leaves this company carrying with him our highest respect for him as an official and our warmest regard for him as a man. May he enjoy long years of health and happiness."

Mr. Brown has been president of the New York Central lines

just five years. His most conspicuous work has been his relations with the public and his efforts to bring about a better understanding between railroad officers and their patrons—the public. A courteous man himself, he did a good deal to improve the New York Central's relations with the public which it served. He had a hard task. The New York Central's traditions were against him in this respect, and he inherited an organization which was hardly comparable to that on other of the strong American railroads. He studied diligently the problems of his lines, and left them in a better situation than when he came to them. He was not the man to take an uncompromising attitude toward labor unions; he was possibly too kind-hearted a man for this.

Mr. Brown was born in 1853 in Herkimer county, N. Y. He has worked his way up with no other help than the strong constitution and mental capacity with which he began life. He is a studious man, clear headed, with retentive memory, and learns a new thing quickly. It follows that he is an accurate judge of men and of subjects. He began railway work when he was 16

years old. For a year he worked as a section hand and fireman on the Chicago, Milwaukee & St. Paul. He learned telegraphy and was made a telegraph operator. After two years he went to the Illinois Central as a train despatcher, and served in this position later on the Chicago, Rock Island & Pacific and on the Chicago, Burlington & Quincy. He was made chief train despatcher on the latter road in 1880, and in 1881 was made trainmaster. He was appointed assistant superintendent in 1884, and superintendent in 1887. In 1890 he was appointed general manager of the Hannibal & St. Joseph and the Kansas City, St. Joseph & Council Bluffs, both part of the Burlington system. In 1891 he was made also general manager of the Chicago, Burlington & Kansas City and the St. Louis, Keokuk & Northwestern, and in 1896 became general manager of the Chicago, Burlington & Quincy. In July, 1901, Mr. Newman, then president of the Lake Shore & Michigan Southern, brought Mr. Brown to that



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W. C. Brown.

property as vice-president and general manager. At this time Mr. Newman had just been made also president of the New York Central & Hudson River, and he chose Mr. Brown as the man to be left in direct charge of the Lake Shore. He had previously worked with him for a number of years. This recognition of Mr. Brown's value is particularly striking, as Mr. Newman's action was an exception to his long-established policy of never bringing to a property an outside man. A few months after he came to the Lake Shore, Mr. Brown was made also vice-president of the New York Central & Hudson River, and later his authority was extended over other New York Central lines. He succeeded Mr. Newman as president in 1909.

### HAS THE INTERSTATE COMMERCE COMMISSION'S SYSTEM OF ACCOUNTS MET THE NEEDS OF THE COMMISSION?\*

BY WILLIAM E. HOOPER.

The first idea of the Interstate Commerce Commission in formulating the system of accounts which it prescribed for railroad companies was to make a clear distinction between investment in the property and the expenses of running the property and to compel uniformity in this regard. The next step—the one which the commission is about to undertake—is that of showing the cost of different classes of railroad service. The experiences of the commission in its endeavors to regulate railroad rates are ample justification for an attempt to get this information.

The one definite restriction that the courts have placed on the power of the Interstate Commerce Commission to reduce rates or to order additional service is that such orders shall not deprive the railroad company of a fair return on the value of its property. The courts have never placed a limitation on the amount of profit which a railroad company might earn except this minimum, below which the legislature or commission could not make reductions. When the commission began, therefore, to issue orders reducing rates, the easiest defense which the railroad lawyers found against such rate reductions was the plea that these reductions deprived the company of a fair return on the value of its property. Incidentally it might be mentioned that a good many railroad men have serious doubts as to whether this defense was the best one that could have been found. A lawyer, however, is engaged in winning the particular case on which he is employed and not on the establishment of a sound economic theory of railroad rates. But by interjecting this question of cost of service into railroad rate controversies the lawyers have made it incumbent on the commission to make an investigation of their own into this question. The trend, therefore, is at present to attempt to show value of railroad property and cost of railroad service, but the rather unfortunate fact is that it is inherently impossible for accounts alone to show value of property, and so far the students of railroad accounting have not devised any satisfactory method by which the cost of service may be shown. Thus, while accounts can show cost of assets, not value, rates in actual practice are based rather on value of service than on cost of service. But regardless of the facts, the commission was compelled to follow the practice of the courts and to do their best to ascertain the value of the assets and the cost of the service. The Interstate Commerce Commissioners were neither accountants nor practical business men, but as lawyers they recognized that if they were to have their decisions sustained by the courts, they as well as the railroad officers must have at their disposal figures which could be used as a basis for determining the two factors which the court held as so necessary in the deter-

mination of whether or not a given rate was confiscatory.

This was very apparent at the hearing last Monday on the new form of annual reports. The railroad accounting officers protesting against any attempt to separate freight and passenger expenses, were able to show without the shadow of a doubt that it was theoretically impossible to accurately separate freight and passenger expenses. They knew so much more about their subject than the commission that, even where they were in the position of only being allowed to answer questions and not ask them, they could argue the commission to a standstill, but when all was said and done, when the smoke cleared away, the commissioners were found sticking to the one hard and fast fact of which they were sure, and that was that the courts had held that the value of the property employed and the cost of the service were two all important facts in the determination of whether or not a rate yielded a fair return on the property used in public service, and that being so, it was the commissioners' duty to try to ascertain these two facts. Furthermore, they appeared to be determined that they would not let the railroad companies wait until a particular controversy had arisen and then bring forward their figures to show cost of service, but would insist that some method of allocating costs, at least as between passenger and freight service, be adopted while there was no specific controversy going on. This, of course, is a later development of the original idea underlying the formulation of a system of railroad accounts, and when Professor Henry C. Adams was appointed statistician to the commission, his primary task was to have the railroad companies report figures which would show clearly the distinction between expenses of operation and property investment. Neither the commission nor Professor Adams, however, were so shortsighted as to ignore the fact that any system of accounts which they might prescribe should not only serve the purposes of the commission, but should also serve the purpose of the railroad managements, and Professor Adams and the commission have worked in conjunction with a committee of the American Railway Accounting Association, so that the present system of accounts represents something of a compromise between the railroad accountants' and Professor Adams' theories of accounting and the commissioners' own views of what ammunition they might fairly expect the accounts to furnish them with.

The Interstate Commerce Commission could not go back and recast all of the accounts of the railroad companies for past years. They therefore simply drew a line through the year 1907 and said, "From here on the accounts shall show the cost of all additional property acquired; in other words, the further investment in the property." They have succeeded in persuading Congress that a sort of post mortem of the railroad companies' accounts before 1907 shall be made through the so-called physical valuation of the railroads. However, that is another very different story. What we are concerned with, is to see how well the accounts kept in accordance with the commission's rules since 1907 make this distinction between the cost of running the plant and keeping it in repair, and further capital (property) investment.

Let us use certain words in a special or technical meaning. All outlays of money we will call expenditures and will restrict expenses to the cost of running the railroad plant and cost of its current upkeep. By additions and betterments we will mean expenditures which are a further investment in the property. Of course, there are other expenditures, such as interest payments, distribution of profits, etc., which come neither under the head of expenses nor of further investment in the property. Since this distinction between expenses and capital expenditures—additions and betterments—is one of the fundamental conceptions of the Interstate Commerce Commission's classification, the commission's instructions for charging expenditures to the various expense accounts are minute to a degree. In its instructions as to what

\*From a lecture delivered before the Graduate School of Business Administration, Harvard University.



to charge to station supplies and expenses, the commission lists a couple of hundred articles, as, for instance, ice, ice barrels, ice boxes, ice buckets, ice carts, ice tongs, and so on.

Running expenses, or, as the Interstate Commerce Commission calls them, transportation expenses, are easily recognizable as such. There might be some question as to whether certain station supplies were a part of the upkeep of the plant or a part of the transportation expenses, but no one could question that they were not additional investment in the property. The commission considers them transportation expenses. Just where to draw the line, however, between cost of upkeep—which the commission calls maintenance of equipment and maintenance of way and structures—and additions and betterments is sometimes a difficult problem. Apparently the dividing line which the commission has aimed at is the test as to whether or not the expenditure is made to keep the property investment intact, which does not necessarily mean that the earning power must be kept intact. To keep the property investment intact each part of the plant must be kept in repair, and when no longer serviceable to perform its proper work and incapable of being repaired, it must be replaced. Renewal in kind, whether it be a tie, a bridge, a valve gear or a freight car, is plainly maintenance, and as such is an expense and not a property investment. But the commission insists that where a renewal is accomplished not by a replacement in kind, but by a replacement with a part which will do the same or better work, and which is more expensive, the cost of this new part shall be split up and part of it charged to expenses and part to capital investment. So much of the expenditure as represents what would have been the cost of renewal in kind is charged to expenses, the remainder is charged to capital (property) account. This is what the commission means by keeping the property investment intact, and it will be clear that it is not necessarily keeping the earning power of the property intact. With the progress of the science of railroading, with the growth of competition and with the changing demands of the public served, it may be necessary to add quite materially to the original property investments in order to keep the earning power of the property intact.

Although there was at first a good deal of opposition on the part of railroad men and, as was to be expected, the opposition came from both the poor roads and the rich roads from two opposite reasons, to this rigid and, what seemed to practical railroad men, theoretical distinction between expenses and capital expenditures the principles laid down by the commission are now pretty generally accepted and approved of. There are certain difficulties in carrying out these principles, however, that the Interstate Commerce Commission system of accounts did not succeed in overcoming.

The management of a railroad company is very human. There is no scientific basis on which a roadmaster can tell the exact day, month or even year in which a tie or a rail needs renewal; the same is true with ballast and, as far as that's concerned, with freight cars. There is no scientific rule by which a man can tell when he needs a new suit. If he is making money he decides that his old suit can't possibly be used for another season and he orders a new one; if he is in hard luck, the old suit is plenty good enough for another season. Railroads are run on much the same basis. Cars and locomotives can be kept in service for a long time if the road cannot afford to replace them. In other words, the commission's system of accounts does not prevent a management from either starving or fattening up the property. The commission is also faced with this problem. A company buys a locomotive costing \$20,000. Its upkeep, that is, renewal of small parts, current repairs and every so often general repairs, costs on an average \$2,500 a year. At the end of 15 years the locomotive is obsolete and a new locomotive must be bought to replace it. In practice, of course, the new locomotive costs more than the old, but the

commission's accounts provide for this by charging to expenses only the \$20,000 which would have been the cost of replacement in kind. But here we are charging in one year \$20,000 to renewals of locomotives on account of this locomotive, where for the past 14 years we have made charges to repairs only with nothing for renewals. This is seemingly an unfair burden on this year's expense accounts. To get around this the commission prescribed depreciation accounts for equipment and instructed the railroad companies to make an estimate of the life of their equipment and to charge each year to expenses—depreciation—a certain per cent. of the cost of equipment, so that by the time the locomotive or car under normal conditions was ready for the scrap heap, an accumulated charge would have been made large enough to pay for a new locomotive or car. But the commission did not attempt to prescribe at what rate depreciation should be figured, nor did it provide that any actual fund should be created in which the moneys charged over a series of years should be placed. By following the commission's rules the road that had the \$20,000 locomotive which it scrapped, at the end of 15 years would have charged out 14/15 of the \$20,000 before the last year and would have needed to charge to the last year's expense only 1/15, but it would not have had about nineteen thousand dollars in its treasury specifically set aside for the purchase of a new locomotive.

Furthermore, the commission, by not prescribing any rate at which all roads must figure depreciation, has made an exception to its general scheme of uniformity, and thus where one road may figure depreciation on equipment at 4 per cent. of its cost, another road may charge each year but 1½ per cent., and while the companies must explain to the commission in their reports what basis they figure depreciation on, the general public and the security holders have no way of knowing unless they go down to Washington and consult the files of the commission.

Nevertheless, the commission is apparently well satisfied with its own rules for charging depreciation, for while in the system of accounts which is now in use, depreciation is allowed for on equipment only, the newest tentative draft of a classification of operating expenses which the commission has sent to the roads for their suggestions provides for depreciation on every class of material used in maintaining roadway and track, which, of course, includes stations, railroad buildings, etc., and in this newest classification the roads are again left to figure depreciation on any basis which they see fit.

Of course, every once in a while it becomes expedient to entirely abandon a piece of property. A road which was built around a hill may be abandoned and a tunnel driven through the hill. Is the cost of this piece of road that is abandoned still to be carried as an asset on the company's books? Is the cost of building the tunnel to be considered in the nature of replacement of the old line and, therefore, charged to expenses, or is it to be considered an addition to the property and charged to capital account? It is obvious that no depreciation charge can cover a case such as this. It is also plain that the cost of driving a tunnel through the hill over and above what it would have cost to rebuild the old line in the same location is an additional investment in railroad property, but the rub comes when we try to decide how to charge the expenditure which is made on the tunnel but which is equal to the cost of the old line; or rather, and this is the way the commission viewed it, what shall be done with the cost of the old line if the total cost of the new line is charged to capital (property) account?

If a railroad is originally built almost without grading across a piece of rolling country, and later the company decides to make cuts across the hills and fills in the valleys so as to reduce the grade from, we will say, 1 per cent. to a maximum of two-tenths of 1 per cent., the entire cost of the cuts and the entire cost of the fills may, under the Interstate

Commerce Commission's rulings, be charged to additions and betterments, but if a company abandons an old line with two 10 deg. curves in it by building a new line cutting across these curves on a tangent, under the commission's rules the entire original cost of the curved line must be charged to expenses. This is approximately the case which is now being considered by the Supreme Court on an appeal by the Kansas City Southern from a ruling of the commission. The railroads in this case claim that it is entirely illogical and unfair to permit the abandonment of a line vertically, while refusing to permit the abandonment of a line latterly. It is the contention of the Kansas City Southern that they should at least be permitted to charge the cost of this old line abandoned latterly to profit and loss, and I rather think that the commission is not unalterably opposed to the railroad's contention. However, this and the question of depreciation are both questions of detail.

In the main, the commission's system of accounts serves the purpose of the commission admirably insofar as it makes the necessary distinction between expenses and additional investment in the property. The difficulties mentioned are troublesome and in certain cases the hard and fast requirements of the commission are working an injustice, but it is only a question of time until these difficulties are overcome and the main question involved is being successfully solved by the commission.

The case is entirely different with the determination of cost of various classes of service. I suppose it would be heresy to suggest that there is the faintest doubt that cost accounting is and should be the goal of all business accounts, but it is both safe and fair to say that the commission, Professor Adams, the present statistician Mr. Meyers and the committee of eight of the American Railway Accounting Association have not as yet devised a system which can be applied to railroad accounts in such a way as to show, even with a fair degree of accuracy, the cost of various classes of service or even of specific services. One reason for this is that no one has as yet suggested a unit on which we could measure railroad service. Complicated as are the manufacturing operations of such an establishment as the packing business of the Armours, with its multitude of by-products, it is possible to enumerate all of the various products which the business turns out and so get a list of the units which can be used in making an analysis of the work done to produce these units. The manufacturing costs of glue, fertilizer and hides, while all intricately related to the cost of butchering cattle, are in the final analysis the costs of manufacturing certain definite products. Glue is glue, but it was a railroad man who demonstrated that in his business "pigs is pigs" is a fallacy.

The commonly accepted measure of railroad service is the transportation of a ton of freight a mile or of a passenger a mile. But a ton mile is like a statistic with a capital S; it does not exist, or at least there is an infinite variety of them, and furthermore there is no necessary relation between ton miles and dollars and cents. You may say that this is true also of a quart of glue, but as a matter of fact, the variation in the price of glue is comparatively small, while the variation in the price of a ton mile is infinite. If this is so with the price which may be charged for a ton mile, it is even more true with the cost of producing a ton mile. In every haul of freight there is involved a terminal cost at either end, a road movement cost and an overhead charge. In most cases there is also involved a yard expense. These four classes of cost are as intimately and about as simply interrelated as the parts of a Chinese puzzle. To this is added the complication of passenger business, which itself is made up of overhead cost, terminal cost and road movement cost, and in some cases and to some extent yard cost.

But to go back to the ton mile. A ton mile of feathers

packed in pasteboard boxes, even when these pasteboard boxes are crated, is very different, both as to cost of service and value of service, from a ton mile of coal, but 100-ton miles of coal which involves a large terminal expense at both ends and a yard expense and 100-ton miles of coal which is made up only of road movement expense, are quite different, at least as to cost of service, one from the other. If we are to continue to use the ton mile and passenger mile as units of service, it would seem as if the most obvious grand divisions of railroad operating expense would be, first, as between passengers and freight; second, as between materials and labor, and third as between overhead, terminal, yard and road movement expenses.

In the classification now in effect the commission has made no attempt to separate the cost of freight and passenger business, no attempt to separate the cost of materials and labor, and only a partial attempt to separate the overhead, terminal, yard and train movement expenses.

In the tentative classification which the commission discussed last Monday an attempt has been made to show separately in the reports which the roads are required to make to the commission, expenses which are incurred for the movement of freight exclusively, those that are incurred exclusively for the movement of passengers, and those that are joint expense. This is the most radical change from the classification now in effect, and although railroad accountants have rather opposed any attempt on the part of the commission to order the roads to make this assignment of expenses, they have been themselves for a number of years attempting to make it for the information of their own management, and the commission is following and not leading in this respect so far as the railroads are concerned and taking the position imposed on them by law as they see it of leading so far as the courts are concerned. I personally think that on a given division of a road, a study of conditions can be made which will form the basis of a fairly accurate division of passenger and freight expenses. I do not say costs. It is impossible to allocate to passenger service all of the costs for which this service is responsible. For instance, how can we possibly make any estimate of fuel that is burnt by a freight locomotive while standing on a siding waiting for a passenger train to pass? Yet if we are to strictly determine the actual cost of passenger service, fuel burnt by this freight locomotive should be charged to passenger service and not to freight service. The expense, however, is an expense incurred in freight service, and if we can separate, even with a fair degree of accuracy, the expenses of each of these two classes of service, we will have made a long step in advance. On the other hand, I do not believe that any general rules can be laid down which can be followed by all roads or even by different divisions of the same road to separate freight and passenger expenses. The commission is pretty surely working along the right lines in its latest classification of expenses, it seems to me, in this division of freight and passenger expenses, and by making haste slowly it is not only avoiding unnecessary mistakes and expense, but is materially helping the development of railroad operation as a science.

The classic example of the cost of fuel for the freight train standing on the siding waiting for the passenger train was given an added frill by one of the railroad accountants at the hearing on Monday by his further supposition that the freight train was made up of cars of mixed merchandise, with which there were interspersed three cars of company fuel to be used in both freight and passenger service. This last touch adds a bit of humor to the objection, but it does not seem to me to make the objection insurmountable. It would be easy to find examples in factories where cost accounting is being used with great apparent success of expenses such, for instance, as the surreptitious use of the long distance telephone by one of the



general bookkeepers for a private message to a friend, that could not be accurately allocated to the cost of any product or classes of products.

When we go further, however, than to try to separate freight and passenger expenses, and try to determine even approximately the cost of hauling a particular ton of freight between two specified towns, we get into the field of almost pure conjecture unless we are willing to accept averages for comparative purposes and guesswork founded on what has proved in the past sound judgment.

If one were to predict what the next step would be after a division of freight and passenger expenses I would say that it would be a division as between different classes of service. In other words, a partial abandonment of the ton mile and passenger mile as sole units of service. There is in passenger service, through express service, through local service, suburban service and commutation service, to name a few of the more important, but the classes of service are not infinite in number, and the same is true of freight service. There are expedite through freight trains which have to be run regardless of tonnage; there are slow drag freights which have to be sent out only when the locomotive is given its full rating, and so on. Working along these lines it might be possible to approximate a fair estimate of the average cost in each class of service. If we could get the Interstate Commerce Commission to make some sort of a binding confession of faith which would commit them irrevocably to the principle that value of service was a far more important factor in making rates and in the question of the reasonableness of rates than cost of service, and that they would use figures for cost of service only where the defense was set up that a reduction in rates was confiscatory, then I believe that the railroad accountants and railroad managers would be far more willing to help the commission in its efforts to do what it believes the law and the courts have imposed on it, namely, to get at some basis of approximating costs. The trouble is just this: The courts fixed a minimum below which rates could not be reduced. Legislators, the professional agitators and the political appointees on state commissions have tried to make it their business to make this also the maximum. The courts have never held that the minimum rate which was legal was a reasonable rate, and no thinking man who had the responsibility of managing a business would say that a bare minimum return on the business which would keep it out of present bankruptcy was a reasonable return, and yet that is the tendency in political agitations since the political agitator is not responsible and can't be held responsible. There is this danger in going to work to develop a cost accounting system for a railroad company in the present state of public opinion. If commissions—I do not say the Interstate Commerce Commission but rather state commissions—and political agitators are to be given the opportunity to pick out a particular service and say, "You are receiving a much higher rate on this service than it is costing you to perform this service; you must reduce it," and be able to go to the court and win that particular case, in time it is perfectly obvious that every rate which yields more than a slight margin above cost will be hammered down and the result, of course, will be utter bankruptcy.

**NEW LINE FOR RUSSIA.**—The construction of a railway line from Odessa, Russia, to Akkerman has been discussed for a number of years and the project now appears to have taken definite shape. The chief constructor of the proposed line has arrived in Odessa and many arrangements preliminary to commencing active work have been completed. A new building to be used for administrative offices is now under construction in Odessa and, under the present plans of the company, work on the new line between Odessa and Akkerman will be started early next year.

## A PLAN FOR THE JOINT PURCHASE OF FREIGHT CARS.

Newman Erb, president of the Minneapolis & St. Louis, has suggested a plan for financing the purchase of 200,000 freight cars through an association to which the railways of the country would subscribe \$25,000,000, the balance to be raised by the sale of equipment bonds. The plan is outlined by Mr. Erb in a letter to the *Railway Age Gazette* as follows:

"The present condition of the railroads has become alarmingly serious, and their credit is now impaired to the point where additional burden has been put upon them in the larger interest charges for their money requirements, difficult for them to obtain except through makeshift temporary loans, besides the increase in the cost of transportation.

"It appears to me that the nationalization of our railroads is inevitable if they are to meet the requirements of the future, unless they are placed upon an earning basis that will increase the factor of safety to investors and give them a stability which has been progressively undermined since the Interstate Commerce Commission was invested with authority to control rate-making, an authority which has since been exercised almost continually downward.

"Our railroads are obliged each to furnish a large proportion of cars for interline, interstate, and interchange traffic. Under existing conditions, the burden of supplying the equipment used for this tonnage movement should be borne in common by the carriers, and none of them should be individually burdened, under conditions that involve a strain upon their credit and prevent or embarrass them from readily obtaining money at reasonable rates for their local needs.

"It occurred to me, therefore, as it has to other railway executives, that a plan for an association, financed by the companies in common, for the purchase of equipment to be used in interline traffic would meet the present difficulty. Twenty-five million dollars, distributed in five annual installments of \$5,000,000 each, contributed by the railroads of our country distributed on a mileage basis, would mean \$20 per annum per mile for five years; or, if distributed on a tonnage-density basis, would still be unimportant and furnish within the period named enough to justify a credit of \$200,000,000, sufficient to purchase 200,000 cars.

"I am convinced that with the joint credit, 20 or 30-year serial equipment bonds could be marketed readily from time to time, and with the cars acquired, distributed as required by the association in control, they would earn through the per diem charge more than sufficient to pay the interest requirements, renewals, insurance, and principal.

"I have not elaborated the details of this plan, which I expect to do, however, but simply outlined it here, in the hope that its presentation may invite a discussion on the subject from those most interested."

**BUENOS AYRES & PACIFIC RAILWAY.**—This company controls the greater part of the international railway route between the capitals of Argentina and Chili by its operation of the lines between Buenos Ayres and the Chilean border. Its operation of the Argentine Great Western Railway gives it a valuable traffic in wine products. It also has a long lease on the Bahia Blanca & North-Western Railway, which gives it an access to another port, and it operates the Villa Maria & Rufino Railway. The total mileage operated is now 3,417 miles, an increase of 69 miles since the previous year. The results of the combined system during the year ending June 30, 1913, were, on the whole, distinctly satisfactory, and the increased dividend has been fully earned, without its being necessary to distribute profits up to the hilt. To some extent the increase in the earnings is due to a comparison with a period when traffic was considerably disturbed for nearly two months by the enginemen's strike. The period under review has, consequently, benefited by the carriage of wheat and maize delayed because of the strike.

## COMPARISON OF FREIGHT TRAIN AND CANAL BOAT RESISTANCE

BY HAROLD A. HOUSTON,

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Because of the recent discussion concerning the feasibility of the proposed Great-Lakes-to-the-Gulf deep waterway the writer has prepared the following few facts as an argument against such a waterway as is proposed when service and cost, from the standpoint of time and speed, are the paramount issue. The canal barge data was obtained from tests made with barges having capacities ranging from 137 tons to 1,041 tons gross displacement. Those made on the Burgundy, St. Dizier, De Jorgny canals and the River Seine were conducted by M. De Mas and those on the Dortmund-Ems Canal by Herr Haack, all in Europe. The data on the Lehigh Canal was obtained from tests made near Mauch Chunk, Pa.

The boats under test were in actual service, and the tractive effort was measured by inserting a dynamometer in the tow-

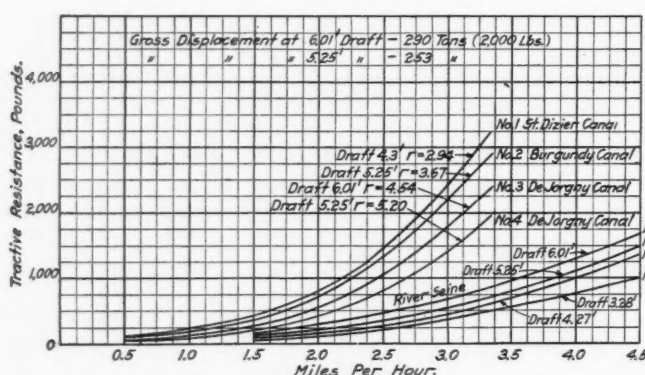


Fig. 1—Relation Between Tractive Effort and Speed for Flute Type Boat.

rope, which gave a direct measure of the resistance sought. The resistance thus determined is known to vary with skin-friction, coefficient of fineness, coefficient of displacement, ratio of canal wet-section to midship immersed cross-section of the boat, hereafter referred to as  $R$ , with wave action, with sunken water surface, etc. In the selection of data an attempt has been made to have these conditions comparable. The facts concerning the resistance of the trains were taken from the results printed in a bulletin published by the University of Illinois Engineering Experiment Station.

The experiments conducted by M. De Mas, Inspector General of France in 1895, and published as "Recherches Experimentales sur le Material de la Battellerie," is probably the best material to be obtained in regard to tractive resistance of the smaller type of canal boats. M. De Mas used a boat of the "Flute" type, 99 ft. long, 16.43 ft. beam, 6 ft. maximum draft, 290 tons (2,000 lbs.) gross displacement, having a coefficient of displacement of 0.952, and having a displacement of 9,270 cu. ft. This same boat was used for tests in the St. Dizier, Burgundy, and De Jorgny canals, and in the River Seine. The width of the Seine was 40 times the width of the largest boat, and the depth was three times the greatest draft, hence the value of  $R$  became so large that its effect in the boat action became negligible, or approached zero as a limit.

The results of these tests are shown in Fig. 1, where the tractive resistance as measured in the tow-line is plotted as ordinates against the speeds in miles per hour as abscissae. Curves Nos. 2, 4 and 6, wherein the boat has the same draft, but is operated in waterways of different cross-section, show that a decrease in the value  $R$  gives a greater tractive resistance for any constant speed. This statement is further amplified by the curves from tests in the River Seine. Here it is seen that the tractive resistance increases directly as the draft increases, but

as the draft increases, the ratio  $R$  decreases; therefore a decrease in the value  $R$  gives an increase in the tractive resistance for any constant speed. Hence, it would seem, that for efficient propulsion of a barge, the value of the ratio  $R$  should be as large as the conditions will justify.

Fig. 2 shows the relation between the tractive effort and speed for the freight trains and canal barges. Curve No. 1 is taken from experiments conducted on the Dortmund-Ems canal and represents the normal loading of the barges, giving a draft of 6.6 ft., 1,041 tons gross displacement. Curve No. 2 is also taken from experiments on the Dortmund-Ems canal with two barges in tow. It represents the normal loading of the barges, giving a draft of 6.6 ft. for 2,082 tons gross displacement, or 1,041 tons per barge. Curve No. 3 is taken from Curve No. 2 in Fig. 1, and represents approximately the normal loading. Curves 4, 5 and 6 are taken from experiments made on the Lehigh canal, in the United States, and represent the resistance offered by barges in trains of 4, 2 and 1, respectively, each barge having a draft of 5.18 ft. for 137 tons of gross displacement. Curve No. 7 is taken from data obtained from the Tetlow canal (Europe) and is only approximate, due to three points only being obtained between the speeds of  $2\frac{1}{2}$  to 3 miles per hour. Curves 8, 9, 10 and 11 show the relation existing between tractive resistance in pounds per ton and speed in miles per hour for various weights per car in freight trains.

From this chart it will be seen that there is a point where the tractive resistance of canal barges is equivalent to tractive resistance of freight trains. It will also be noticed that below three miles per hour the barge resistance per ton is much less

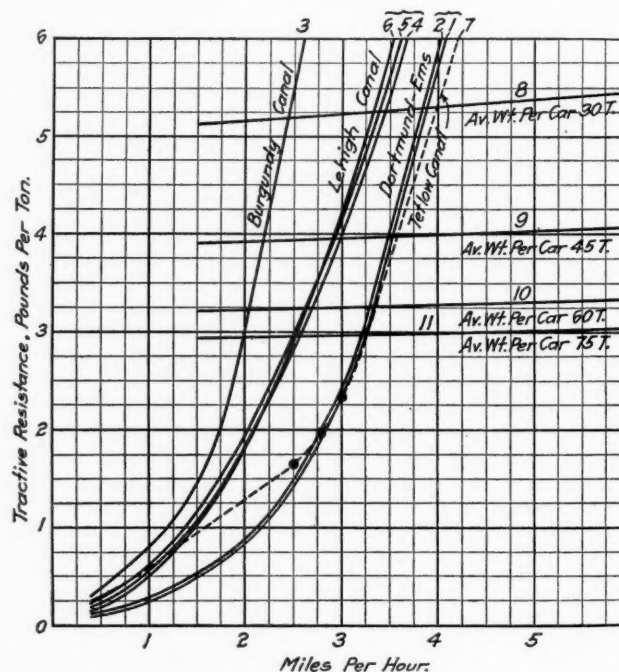


Fig. 2—Relation Between Tractive Effort and Speed for Freight Trains and Canal Barges. (One Ton=2,000 lbs.)

than that of trains, but that above that speed the freight trains have much the advantage. From previous experiments and reports there seem to be practical reasons, such as the washing of canal banks, etc., which prevent any material increase in the speed of the canal boats, and it is, therefore, under ordinary circumstances, neither desirable nor advantageous to attempt an increase in speed over a certain limit—say from 2 to  $3\frac{1}{2}$  miles per hour, the present average speed. The action of a boat in a canal is decidedly different from its action in open water, where the body of water is large enough freely to permit the water particles from every direction to fill in the void left by the boat. It is, therefore, to be expected that the resistance in a canal will be larger than in open water.



# THE STRIKE ON THE SUNSET LINES.

The Engineers, Firemen, Conductors and Brakemen Leave  
Service for Four Days. President Scott's Statements.

The engineers, firemen, conductors and brakemen of the Sunset Lines of the Southern Pacific went on strike on November 13 at 7 o'clock p. m. The strike involved the lines from New Orleans to El Paso, including branch lines in Louisiana and Texas, but did not involve the Houston & Texas Central and the Houston East and West Texas. The total mileage affected was about 2,400 miles. The strike was brought to an end on November 17.

The breach between the company and its employees was the result of a long series of disputes and negotiations pertaining chiefly to cases of discipline. On September 16, after having been negotiating with representatives of the Brotherhood of Locomotive Engineers, the Brotherhood of Locomotive Enginemen and Firemen, the Order of Railway Conductors and the Brotherhood of Railroad Trainmen, the company was notified of the formation of co-operative committees which had been formed to handle the grievances of the employees in both engine and train service.

The management indicated that it was willing, as it had been in the past, to confer with the representatives of the different organizations individually regarding grievances and other matters of interest to them individually, and to confer with them jointly regarding matters of interest to them jointly, but it refused to confer with them jointly regarding matters which were of interest and concern only to the individual organizations. In consequence, on November 12 notice was served on G. S. Waid, assistant general manager, that unless he consented to meet the committees in joint conference the employees concerned would withdraw from the service on November 13 at 7 p. m. Mr. Waid replied that as it seemed impossible for the company and the men to agree, the management, in the interests of all concerned, had formally requested the Federal Board of Mediation and Conciliation to use its good offices to, if possible, bring about an amicable settlement. No reply was made by the representatives of the brotherhoods to this communication, but on November 13 at 6:26 p. m., just 34 minutes before the time set for the strike, a communication from them was handed to W. B. Scott, president of the Sunset-Central Lines. This set forth that the employees had received a telegram from G. W. W. Hanger, assistant commissioner of mediation and conciliation, Washington, D. C., offering the friendly services of the board to bring about an amicable adjustment, and that the representatives of the brotherhoods had replied that they would not concede that the questions involved were a matter for mediation and conciliation and that they were "therefore obliged to advise that the only possible way to avert a strike is for the company to agree before 7 p. m. this date to meet our joint committee for the purpose of discussing matters of difference." No other move was made until the strike was declared.

The action of the employees came at a time when there were large crops of cane and other products awaiting movement on the Sunset lines, and owing to this and the precipitateness of the step taken—together with the fact that it was taken after the railway had appealed to the Federal Mediation and Conciliation Board and the employees had refused the intervention of that Board—public sympathy along the lines seemed to be with the management of the railway. The newspapers severely criticised the action of the employees. The strike was ended by the action of the management accepting the proposal of the Federal Board of Mediation and Conciliation that it meet the committee of the four unions, with the understanding, however, that if no agreement can be reached, the entire matter shall go before the board.

President W. B. Scott of the Sunset-Central Lines has given to the press statements covering the history of the negotiations and the nature of the road's differences with the employees. A

statement issued by him on the evening of November 13 is in part as follows:

"Beginning with the first part of the current year, the company's officers commenced negotiations with the individual committees, as dates could be arranged, in an effort to dispose of such cases as the committees desired to present. After numerous conferences with the engineers' committee in February, March and April, settlement was reached on all cases presented by them for consideration, and the committee disbanded, apparently satisfied.

"Several conferences were held with the firemen's committee during January, February, March and April, and after a grand officer had been summoned, satisfactory settlement was reached on all grievances submitted by them.

"During June and July conferences were held with the conductors' and brakemen's committees individually and jointly and most of the cases disposed of; there being left unsettled but one case presented by the conductors' committee and fifteen cases presented by the brakemen's committee. A grand officer of the brakemen's organization was called, and after additional conferences in August the number of unsettled cases was reduced to ten; some of which have since been dropped by that organization. The unsettled cases were held in abeyance by the committee, evidently for the purpose of injecting them into the present co-operative movement.

"In the meantime, several engineer members of the firemen's organization were disciplined, and as the provisions of the engineers' agreement prohibited the firemen's organization from handling such cases, these engineers selected an engineer on their own seniority district, usually a chairman of the Brotherhood of Locomotive Firemen, to represent them. Conferences were held and letters were passed covering all of these cases, but as the discipline had been properly applied, the management declined to reinstate such engineers as had been discharged or cancel demerits that had been assessed. The cases were dropped, and in so far as the company's officers were concerned, were considered closed.

"In August the Brotherhood of Locomotive Engineers and the Brotherhood of Locomotive Enginemen and Firemen formed what they termed a Joint Working Board of the Brotherhood of Locomotive Engineers and Brotherhood of Locomotive Firemen and Enginemen, and immediately asked for a conference to discuss a long list of alleged grievances, which included cases that had previously been handled with the firemen's committee, all of the cases of engineer members of the firemen's organization, which had been handled to a conclusion in the manner prescribed by the engineers' agreement, and a number of matters that had not previously been presented. They also presented requests for changes in the engineers' and firemen's agreements, alleging that such changes were made necessary by the formation of the Joint Working Board. Conferences were held in September with the so-called Joint Working Board, and some of the grievances disposed of. Quite a number of the requests were considered unreasonable by the company's officers and no settlement was reached; the company also declining to reopen or reconsider cases that had heretofore been handled to a conclusion by the firemen's organization and by the engineer representatives from the firemen's organization. Notice was served on the company that grand officers would be summoned to the assistance of the committees and negotiations were suspended awaiting their arrival.

"The next heard from the organizations was the letter of September 16, signed by the chairmen of all four organizations, notifying the company of the formation of the co-operative committees, to which a reply was given under date of September 19,

and another letter received September 25 reaffirming the former letter.

"On September 20 the general chairman of the conductors requested a meeting to discuss six alleged grievances, one of which had previously been settled by a former general chairman. On September 26 a supplemental letter was received submitting two additional cases. Owing to high water and other important matters requiring attention, the officers of the company were not able to set a date to discuss these cases immediately, and on October 17 a letter signed by grand officers of all four organizations submitting a list of sixty-seven alleged grievances, and requesting joint conference for the purpose of adjusting them, was received. This list of grievances included all of the unsettled questions with engineers, firemen and yardmen; the cases presented by the conductors which had not been discussed and were not properly on appeal to the grand officers; several cases that had been previously settled with the general chairman of the conductors, and even grievances which had not previously been presented by any of the organizations. It was obvious that the list of alleged grievances had been padded with everything which could be gathered up in order to make it appear that the organizations were very much aggrieved and which were intended to form a basis for the co-operative committees.

"The settlement of the grievances listed, however, seems to have been temporarily lost sight of and the sole aim and purpose of the committees now appears to be to force the company to meet the four organizations jointly so that in the future they will be in a better position to force their will in matters of pay, working conditions, administration of discipline, and rules of operation.

"The correspondence following receipt of this letter up to the time the committee decided to submit the matter to the men has been published, and clearly indicates the company's position with reference to meeting representatives of the four organizations jointly. Existing agreements with each organization, still in effect, clearly and specifically provide method of handling grievances, and by whom they may be presented. Neither party to these agreements can arbitrarily and without consent of the other party change any feature of the agreements, and an attempt to do so (except under methods prescribed in the agreements) by a strike ballot or otherwise, is clearly a breach of agreement.

"The list of alleged grievances presented in the committee's letter of October 17 includes request for reinstatement of eighteen discharged employees, and in some instances demand is made that they be paid for all time lost. Some of these employees have been dismissed for insubordination; others for incompetency and carelessness; one for drinking on duty, and others for responsibility for accidents and violation of the company's rules; all of which offenses are considered of a capital nature and generally throughout the country meet with summary action. Seventeen of the cases involve interpretations of the individual agreements, and may be honest differences of opinion, although the company's officers do not see how the language involved can be susceptible of any different interpretation than that they have placed upon it. Seventeen of the cases are not properly included in the present negotiations, for the reason that they have not been handled in the regular manner, some of them not having been handled at all. Four of the cases are reversals of decisions previously made and accepted by the regularly constituted representatives of the organizations. The balance of the cases are protests against present practice with reference to various reports, examinations, etc., and requests for privileges not heretofore enjoyed; all of which are outside of the various agreements and under no circumstances could be considered grievances.

"With other demands, the committees seek to force back into the service, men who have been properly discharged for cause; to be relieved of making out reports made mandatory by federal laws governing locomotive boiler inspection and safety appliance standards; the discontinuance of the practice of re-

examining train and enginemen on time table and train rules; the discontinuance of re-examination of engineers on machinery; and a protest against methods adopted for the re-examination of train and enginemen on color perception, sight and hearing.

"Rules are frequently altered, revised and amended; locomotive design is constantly changing, and improved appliances are being added, requiring a thorough knowledge on the part of the engineer. The re-examinations, to which objection is made, are not only extremely important because of their relation to the employee himself, but the safety of the general public which is entrusted to the company's care makes it absolutely necessary that not a single precaution be omitted or neglected. The practice is one generally commended and is approved and recommended by the American Railway Association. In fact, such examinations and rule enforcement, as were found lacking on the New Haven road and for which that company was severely criticised in the report of the Interstate Commerce Commission on the Wallingford wreck, have been in effect on the Sunset Lines for many years without opposition, and only at this time are they objected to by the Co-Operative Committees of the four organizations.

"Under present conditions, numerous moves made by the company towards complying with Interstate Commerce Commission and railroad commission rulings, and to effect a greater degree of safety in operation to fulfill the growing demands of the traveling public, have met with the disapproval of the chairmen of the Grievance Committees, and they are making every effort to prevent them.

"Another practice complained of by the organizations, and listed as a grievance, is the method employed by the company in making efficiency tests, a 'Safety First' work inaugurated by these companies in 1902. This consists of checking employees in their observance of danger signals displayed at unexpected places and hours, with the expectation that those who are inclined to disregard danger signals or take unnecessary chances will be detected before, rather than after, an accident. These checks show whether or not flagmen promptly and properly protect their trains as required by the rules. If 'Safety First' was always considered, railroad accidents would be few in number and the consequences rarely serious. The Titanic disaster well illustrates the awful results that sometimes follow the failure to observe well established rules of safety. These tests are absolutely essential, and have proven of great benefit not alone to the employees in demonstrating their efficiency, but in affording to the public and employees the protection they have a right to expect from transportation lines, active in the promotion of safety in operation.

"This will be more fully understood and appreciated by the record of the so-called Southern Pacific Lines, whose 9,768 miles of rail lines have during the past five years transported 209,674,539 passengers without a single fatality as the result of a train accident. As a further evidence of these companies' efforts in protecting the safety and welfare of their employees and the traveling public, the records will show that the various lines of the Southern Pacific have constructed, and have in operation, a total of 3,224 miles of track protected by automatic electric block signals, the most modern and effective system of train protection so far developed and successfully operated. The mileage of road thus protected is greater than that of any other railway system in the world.

"In steel car construction, the Southern Pacific was the pioneer in an effort to promote 'Safety First' by developing and constructing in 1906 the first steel passenger coach built in America. Since that time their lines have added annually to their equipment, and now own and operate a large number of all steel passenger cars, with additional similar equipment ordered.

"The grievance committees have charged that discipline is too severe on these lines. As offsetting this the following may be of interest:

"On August 13, 1913, a letter was received from W. S. Stone,



grand chief of the Brotherhood of Locomotive Engineers, advising that the engineers on these lines were complaining of the severe discipline that was being administered. In order to convince Mr. Stone that the complaint was without foundation, the records were gone over for the period of a year prior to that date and a statement prepared showing every engineer who had been dismissed, the cause of his dismissal, and whether or not he had subsequently been reinstated. This statement showed that a total of 58 engineers had been dismissed for proper cause. Notwithstanding this, 22 of them had been reinstated on pleas of leniency and as a result of previous good records. Since that time others of them have been reinstated for the same reasons. Of those remaining out of the service 12 were dismissed for drinking.

It will clearly be seen that if any error has been made in the matter of discipline, it has been in the direction of leniency; yet this fact does not seem to appeal to the representatives of the organizations. When employees are guilty of dischargeable offenses or are so unfortunate as to make serious mistakes, proper discipline demands that they be removed from the service, yet the organizations seek to encourage carelessness and improper conduct by attempting to force the company not only to reinstate, but in some instances reinstate with full pay, employees who have been taken out of the service for proper cause.

"The direct personal interest of the traveling public in the maintenance by railroads of proper discipline of their employees and in the removal of restrictions in contracts between railroads and their employees tending to interfere with the exercise of proper discipline, has been brought home very forcibly by recent accidents to passenger trains resulting in the great loss of life; and traceable more or less directly to the terms of employment which the organizations of trainmen are able to exact. In the recent report of the Interstate Commerce Commission on the accident on the New York, New Haven & Hartford Railroad at North Haven, Conn., Commissioner McChord most emphatically announced that 'Safety First' was the prime duty of railroad management, and that demands of organizations of employees or threatened strikes would afford no excuse for contracts which tended to lessen the employer's right to make and enforce all reasonable rules to promote care and efficiency of trainmen, to punish infractions of such rules, and to secure safety of operation, so far as human care and foresight can do. Responsibility for accidents cannot be shifted from the officials to employees by reference to contracts executed under threat of strikes.

"The position of the officers of the companies in respect to the pending demands of their employees has been in conformity with their duties as they are defined in the report of the Interstate Commerce Commission. If the companies' employees have the same regard for the commission's report and recognize the duties which railway employees as well as railway officials owe to the public, they will not persist in their demands. Certain it is that if the traveling public had a conclusive voice in the determination of the controversy, a due regard for its rights would lead to its approval of the stand taken by the officers of the railroads. The question in a nutshell is, shall the company buy its peace with employees at the price of the safety of the public?"

The company has made public the following analysis of the grievances which are given by the employees as the causes of the strike:

NUMBER OF CASES INCLUDED AS GRIEVANCES BY THE DIFFERENT ORGANIZATIONS.

O. R. C.....	10
B. R. T.....	19
B. L. E.....	20
B. of L. F. & E.....	14
Miscellaneous .....	7
1. Leniency .....	18
2. Interpretations of schedule .....	17
3. Not heretofore presented .....	17
4. Reversal of decisions previously accepted.....	4
5. Discontinuance Hours of Service report at terminals.....	1
6. Discontinuance receipting for engines at terminals.....	1
7. Discontinuance engineers making out fuel tickets.....	1

8. Discontinuance re-examination on train rules and machinery.....	1
9. Protest against method re-examination of men on eye-sight, hearing and color perception .....	1
10. Protest against correspondence .....	1
11. Protest against enginemen handling locomotive indicators.....	1
12. Protest against present method surprise tests.....	1
13. Protest against moving engines under steam without engineers.....	1
14. Request permission report for duty by telephone.....	1
15. Request boilerheads and side sheets of engines be covered.....	1
16. Request Mikado locomotives be weighed under service conditions..	1
17. Request ice be furnished at certain terminals.....	1
18. Request fires switch engines be cleaned at noon hours.....	1
19. Request seats on road engines for brakemen.....	1
20. Request for joint working agreement B. L. E. and B. L. F. & E..	1

In an earlier statement President Scott said in part:

"In all matters of common interest these companies have never in the past, and will not in the future, decline to confer with those organizations. For example: the companies were already negotiating with the engineers and firemen jointly with a view to the making of a joint schedule. Similarly, the conductors and brakemen, whose duties are to a great extent common, are now working under a joint schedule.

"In matters of joint interest, such as the federal hours of service act, equally applicable to all, these companies have never declined to confer jointly with representatives of the four organizations involved.

"The purpose, therefore, of a demand that matters pertaining to the duties of brakemen and conductors shall be determined by joint action with members of a totally distinct and foreign service, and similarly with regard to matters affecting engineers and firemen, is to bring to bear upon these companies the joint and united force of the four organizations to force concessions which these companies, in justice to the public and themselves, and in obedience to the law, ought not and cannot make.

"During the present session of the Congress of the United States, at the suggestion of leading representatives of the four organizations, railway interests of the country acceding thereto, a Board of Mediation and Conciliation was constituted for the express purpose of determining issues of this character, and by wise and conciliatory mediation protect the traveling and shipping public from the inevitable disaster which follows a breach between a railroad company and its employees. These companies cheerfully recognized the fact that they are public service corporations and that their first duty is to obey the law and serve the public interest.

"They, therefore, promptly proposed a reference of the controversy to the board above mentioned, and it is with profound regret that they received notice from the representatives of the four organizations involved that all mediation was declined, and it was with profound astonishment that they received notice that the membership of the four organizations would leave the service of these companies thirty-four minutes after notice that mediation had been declined.

"We state to the public that this is the sole issue involved in this controversy. A list of sixty-seven alleged grievances has been given out to the press. With regard to these, an analysis thereof will disclose:

"(1) That the majority of them, when tested by clear contract provisions, or admittedly long-established practice, are either without merit or have already been disposed of, or are not properly before the grand officers of the respective organizations and the general officers of these companies for consideration.

"(2) That, with two possible exceptions, none of the alleged grievances present matters of common interest to the four organizations, or affect the relations of the four organizations, as a whole, with these companies, which have always been willing (and I have specifically so stated in communications to the representatives of the four organizations involved) to meet representatives of all four organizations in joint conference where grievances involve matters of common interest to all of them. This would apply to the two exceptions above referred to, but would not apply to the remaining sixty-five alleged grievances, where no matter of common interest to the four organizations making the demand for a joint conference is involved.

"(3) That these companies have never declined, and do not

now decline, to proceed in an orderly way, according to the methods specifically provided in existing contracts, and established by usage and practice of years' standing, to dispose of these alleged grievances, meeting the representatives of the organizations involved and making an honest effort to reach a fair adjustment.

"(4) That the demand made, upon the refusal to comply with which this strike has been ordered, is made for the purpose of forcing, through the combined power of four organizations, a compliance with demands which these companies submit are unreasonable and unjust, and, in many instances, inimical to the public interest.

"(5) That putting upon the grievances a construction most favorable to those making the demands, there is no issue, or issues, between any one of the organizations involved and these companies of sufficient gravity to justify the organizations in ignoring the public interest, which must inevitably suffer through the extreme action which they have taken, and in peremptorily declining mediation tendered by the federal board."

### NATIONAL INDUSTRIAL TRAFFIC LEAGUE.

The annual meeting of the National Industrial Traffic League was held at Chicago on November 13 and 14, with President J. M. Belleville of the Pittsburgh Plate Glass Company, in the chair.

A form for the preparation of claims against railways, previously formulated by the Committee on Preparation of Claims, and approved by the Freight Claim Association, was adopted.

In connection with the report of the Committee on Uniform Classification, President Belleville gave an account of a meeting with representatives of the carriers and stated that the latter had already carried out some of the league's suggestions, particularly in giving publicity to the work of the Uniform Classification Committee. He also stated unofficially that the Western Classification Committee now had under consideration a plan which is in accordance with the suggestions of the league for a permanent committee of three or four members to be in continuous session at Chicago, and he hoped that the official and southern committees would do the same thing, and that the three could be combined to form a committee on uniform classification. The president also read a letter from the chairman of the executive committee on Uniform Classification, asking for a joint conference with a committee of the league.

There was a long discussion of the subject of incomplete expense bills, in which many members declared that the trouble was due to carelessness on the part of shippers, while others blamed the carriers. H. C. Barlow, traffic director of the Chicago Association of Commerce, described the work of a joint committee upon this subject with a committee of the American Railway Association, and said that the carriers were co-operating with the shippers in the effort to improve conditions.

The committee on Shippers' evasion of the Interstate Commerce Law offered a resolution that the League put itself on record as opposed to any evasion of the law in any way, and that it should lend its assistance to the railways in all attempts to stop such evasion.

Oscar F. Bell, traffic manager of Crane Company, presented the report of the Committee on Weighing, saying that two conferences had been held with a committee of the American Railway Association and a third was now being arranged for the purpose of discussing ways of carrying out the Interstate Commerce Commission's wishes. He believed substantial progress was being made. There was considerable discussion of the amount of tolerance to be allowed in ascertaining weights and particularly on the question of the removal of refuse in cars. The committee condemned the practice of leaving refuse in cars, and desired that the League should go on record as being willing to co-operate with carriers in this respect, but the members could not agree as to whether it was the duty of the railway or of

the consignee to remove debris from carload shipments under various circumstances, and the question was referred back to the committee.

On the recommendation of the committee on legislation, which made no formal report, it was decided to have a new committee on Needed National Legislation, to be appointed by the new president with the advice and consent of the retiring president.

#### POWER TO FIX MINIMUM RATES.

There was an active discussion on a motion that the League recommend that the Interstate Commerce Commission be given power to prescribe minimum rates in order that it might correct discriminations by ordering an increase of an unreasonably low rate instead of only by reductions, often requiring far-reaching readjustments.

F. T. Bentley, traffic manager of the Illinois Steel Company, and H. C. Barlow of the Chicago Association of Commerce were the leading advocates of such a change in the law. Mr. Barlow said that one of the greatest defects in the act, from the standpoint of shippers, carriers and the public, is that the commission has not power to correct a discrimination by removing the cause of the discrimination. Other members thought that the League should not take hasty action on the question and it was decided to defer it to the committee on Needed Legislation with instructions to make a special study and report to the executive committee. If the latter shall be unanimous upon the question it shall have power to recommend the amendment on behalf of the League; if it is not unanimous the subject shall be referred to the membership for a referendum vote.

#### PAYMENT FOR TARIFFS RESCINDED.

The committee on Payment for Tariff Publications had prepared a report voicing opposition to the plan of charging for tariffs or classifications, but instead announced that a subcommittee had attended a conference on Thursday with F. A. Leland of the Southwestern Tariff Committee, at which Mr. Leland announced that in response to the vigorous protests of shippers the circular publishing a schedule of prices for tariffs would be cancelled. A letter from Mr. Leland was read, in which he asked in return the co-operation of the shippers in obtaining relief from certain conditions in connection with the distribution of tariffs which the carriers consider onerous. Mr. Leland asked what practical plan can be adopted under which tariffs can be supplied to traffic bureaus, shippers having traffic departments and other bona fide users of tariffs, and at the same time avoid the waste of sending tariffs to those who do not require them, without discrimination. He also pointed out that tariffs are now handled by the Post Office department as third-class mail at eight cents per pound, while periodicals and newspapers are second-class at one cent per pound, and tariffs are also barred from the parcel post. He also referred to the requirements regarding the posting of tariffs at stations, saying that it is unnecessary to post all tariffs applying from each station and an index of all other tariffs, if tariffs are to be furnished to all who want them. Inquiry has shown that at many stations there are no requests to look at tariffs. He requested the League to appoint a small subcommittee to co-operate with the carriers in obtaining some relief in the three respects mentioned. It was decided to refer the matter to the executive committee for proper action, and at the suggestion of President Belleville the tariff committee was asked to give special attention to the simplification of tariffs.

The committee on Car Demurrage and Storage submitted a report of the results of conferences with the committee of the American Railway Association on Relations Between Railways which resulted in an agreement on proposed rules for notification and computing time. The changes reported were approved by the League. This committee also reported on a new code of rules on storage of freight which the American Railway Association committee has submitted to its association for adoption. This report was also approved.



J. S. Marvin, traffic manager of the National Association of Automobile Manufacturers, submitted a report of the committee on transportation instrumentalities, as follows:

#### CAR POOLING.

"Your committee recently received advice from the secretary that the executive committee of the League had referred to it for consideration and report to the League, the question of a standard box car and pooling of all freight cars by carriers. It has not been practicable for your committee to hold a meeting, but this matter has been considered by correspondence and otherwise, and it appears:

"First: That American Railway Association car service Rule 1 requires that foreign cars must be promptly returned to their owners, as prescribed by Rules 2, 3 and 4. Per diem Rule 19 provides for a commission to supervise and enforce car service Rules 1, 2, 3 and 4. In a recent report this commission stated that the fair use of open cars can be, and now is, effectively regulated by Rule 19, but that the fair use of box cars cannot be effectively regulated by Rule 19 because the practice of home routing in the case of box cars is an economic waste from which it has developed in practice that there is in effect today a pool of this equipment, without regulation, and in its results unjust, in times of car shortage, to originating lines which have provided their quota of cars, and to the public served by those lines, and during times of car surplus, to distributing lines. It was stated that this pool, in justice to the railroads and the public, should be regulated, to the end that each road, when it needs them, should have the use of its quota of this equipment or its equivalent, and objections to a pool are answered by the fact that existing car service rules have not secured to owning roads the use of their cars, so far as box cars are concerned. It was thought that a pool should lead to the general adoption of a standard box car, and that if standard specifications were to be adopted the cost of building cars would be so reduced as to represent a great saving in capital investment. These ideas were formulated by the commission for its own guidance and as the result of concentrated study of car service under existing conditions. The matter is still having attention but without as yet leading to a definite conclusion. We understand that the American Railway Association is now soliciting mail advices from its members on the question of a standard box car 40 feet long.

"Second: It is not clear that it would be practical for carriers to pool all cars. Open cars, and closed cars of a special character, such as refrigerator, furniture, automobile, carriage, stock cars, etc., could hardly be put on a basis of legal tender equipment with ordinary box cars. Whatever action is taken should be such as to emphasize, and not minimize, the necessity of keeping cars of this kind in the service for which they are intended.

"Third: Even with common box cars there is a wide range of usefulness, comparing the older cars of short length and comparatively small cubic and weight capacity with the cars of more recent construction. This, however, should not offer an insurmountable objection to pooling, inasmuch as there is no rule today that guarantees absolutely to any railroad the use of its own cars.

"Fourth: Primarily, freight cars are the property of railroads, and the formulating of rules for their use and interchange rests with the carriers. Your committee has been unable to reach a conclusion that is unanimous on what action, if any, the league can or should take in this matter. But periods of car shortage are of such serious import to the shipping public that in view of the feeling on the part of the public, which is shared by railroad officials, that a change in existing rules could be made to the great advantage of shippers and which would result in greater economy in operation for the railroads, and that a pool of common box cars seems to offer the necessary relief, the opinion prevails in your committee that the League should commend the investigation of this matter by the railroads and that from the

shippers' point of view it is a matter of such importance as to warrant special action by carriers in order that measures of relief may be promptly ascertained."

The report was approved and the subject was re-referred to the committee with instructions to keep in touch with the American Railway Association.

The committee on Demurrage and Storage Charges upon Export Traffic made no formal report, but declared that before any arbitrary adjustment of storage and demurrage rules can be made carriers will have to make as a part of their regulations, particularly as to freight consigned for export or handled on through bills of lading, a guarantee of time from shipping point to the port of export. The subject was re-referred to the committee for continued study.

The committee on demurrage supervisors outlined the plan by which the American Railway Association Committee on Relations between Railways will appoint demurrage supervisors in various districts to secure uniform administration of demurrage rules, and said in conclusion: "It is hoped that through the medium of these demurrage supervisors closer and more amicable relations will result between carrier and shipper and that differences which are largely minor will be adjusted with promptness."

The committee on Tariffs recommended that the letters A and R in a circle be uniformly adopted by all carriers to indicate advances and reductions, respectively, in tariffs, and that the use of letters N, C, E and X be uniformly adopted to indicate other changes, such as additions, changes, eliminations and cancellations; the uniformity to be gradually effected with the issues of new tariffs and classifications.

The report was approved and the subject will be taken up with the Interstate Commerce Commission.

The committee on storage charges upon Domestic Less-Than-Carload Freight reported that there is a wide variation in the charges and practices of the carriers in the matter of storage of freight; at some points 72 hours free time is granted in the case of less-than-carload shipments, and property if not then removed is sent to public warehouse; at other points after the expiration of the usual free time (48 hours) the property is sent to public warehouse; at many other points where there are located public warehouses the carrier furnishes warehouse facilities and charges accordingly for such services. The committee has been unable to present, by reason of the widely divergent views expressed and the different conditions found, any concrete rule for consideration. It was therefore decided to circularize the members for opinions as to a uniform storage charge.

#### GENERAL ADVANCE IN RATES.

After a protracted discussion in executive session on Friday the League decided not to place itself on record as either in favor of or opposed to the proposed general advance in freight rates in Official Classification territory, but adopted a resolution that the League "is in sympathy with the plan of the Interstate Commerce Commission to investigate the question fully," and that the subject be referred to the members "for such action as their interests may justify and require."

A motion was made that the League recommend the reappointment of Commissioner Clements to the Interstate Commerce Commission when his term expires. This was not carried for the reason that it is contrary to the policy of the League to endorse candidates for public office, but a large number of those present declared themselves in favor of his reappointment.

Officers were elected as follows: President, H. G. Wilson, transportation commissioner of the Commercial Club of Kansas City; vice-president, Joseph Keavy, commissioner freight and traffic division, Indianapolis Chamber of Commerce; secretary-treasurer, Oscar F. Bell, traffic manager, Crane Company, Chicago.

The annual banquet of the league was held on Thursday evening at the Hotel LaSalle. George T. Bell, commissioner of the traffic bureau of the Sioux City Commercial Club, delivered an

address on "Traffic Bureaus," and Harry A. Wheeler, president of the Chamber of Commerce of the United States, gave an address on the relations of railways, industrial concerns and the banks to public regulation.

### NATIONAL CIVIC FEDERATION TO INVESTIGATE SOCIAL PROGRESS.

The National Civic Federation, through its Industrial Economics Department, has decided to undertake a national survey in these three respects:

(1) The progress made by this country in the last several decades, socially and industrially.

(2) The ground for the socialistic demand that private ownership in the means of production and distribution of wealth be abolished.

(3) The differences in the fundamental aims and methods of the labor movements, as conducted by the trade unions, the socialist parties, and the Industrial Workers of the World.

The work in detail will be done by a corps of trained investigators, under the direction of a representative advisory council, the sympathy and aid of which can be invoked in this important work. The council will be composed of leaders in the world of labor, of agriculture and manufacturing; representatives of the press, the church, the college, finance, law and medicine, as well as officials of national organizations familiar with many of the specific problems covered by the inquiry. The investigation will be in effect "a national inventory of social assets and liabilities," and will endeavor to show how far the general movement of our republic has been toward progress, and what steps can be taken to establish it firmly on the way to further progress. It is believed that there could be no better time than the present to undertake such work.

A general announcement of the survey has been issued by a committee on plan and scope, of which Dr. Talcott Williams is chairman. The announcement states that it is clear that the twentieth century is to be devoted to the settlement of economic issues, just as the close of the eighteenth and the beginning of the nineteenth century were devoted to the solution of political issues, and that the present social and economic situation brought about by the creation of great corporations, changes in industrial development, large immigration, the massing of population at centers of industry, changes in the conditions of life in large cities, bringing profound shiftings in the distribution of wealth, and the relations between employer and employed, is disturbing to the public conscience of the republic.

"It is sufficiently serious," says the announcement, "in the opinion of many who have the welfare of this nation at heart, to make necessary an impartial, dispassionate and scientific investigation by experts into the economic changes of the last 30 years with a view to ascertaining both our national successes and failures. The course of the new economic era has been sufficient to render it wise to take an account of our national movement and condition, exactly as account of stock is periodically taken in business. The proposed investigation, in order to encompass the facts at issue, good or bad, should include, broadly:

"The factors concerned in the production of wealth.

"The methods by which the wealth produced is distributed among the several factors engaged in production.

"The effect on industrial, social and individual progress."

Among the points mentioned which are to be investigated, are the concentration of wealth, the condition of the farmer, the effect of social legislation, the state of political and business ethics, etc. One of the questions which the investigation will seek to answer is: "Does the popular concept today of the relations to the public of industrial, railway and municipal utility corporations spell progress, as compared with the accepted view twenty years ago? Or is regulation a failure and should the

state take the place of private capital? What, if anything, has been gained in the last decade through the demand of the people for publicity in the business methods of banks, insurance companies, trust companies and other private corporations?" This naturally includes an inquiry into the subject of nationalization of railways, and it is probable a commission will be sent abroad to study the results of government management in foreign countries.

### SAFETY FIRST ON THE WESTERN MARYLAND.

The Western Maryland had its first general "safety-first" meeting at Hagerstown, October 30, and about 300 employees were present. The company's Safety Engineer has sent to every employee of the road cards, properly inscribed, on which unsafe conditions observed by the employee may be made known to the proper officer.

The Hagerstown meeting was addressed by W. P. Borland, assistant chief inspector of safety appliances for the Interstate Commerce Commission, who spoke, in part, as follows:

The most notable and admirable characteristic of the present era of industrial development is the effort to conserve human life. This effort finds concrete expression in safety legislation, both state and national, and in organized efforts to promote safety in the operation of our mining, manufacturing and transportation industries. We all know that it is a fundamental rule of train operation to take the safe side in case of doubt; and we also know that it is not well with the man who causes delay to traffic by doubting too much. He can acquire a better reputation as a railroad man by taking a chance now and then and making a good run with his train. Rules innumerable have been formulated and promulgated to secure safety, but these rules have been violated time after time with the full knowledge of operating officers whose duty it was to enforce them. . . .

These conditions furnish a sufficient reason for the safety first movement, and it is quite obvious that the conditions must be changed if the movement is to become a success. "Safety-first" means the establishment of an entirely different ideal from that which has heretofore existed in the minds of railroad men. It means more cordial and intimate relations between operating officers and employees. . . .

The fundamental principles are well understood by railroad men of experience, and it does not require an elaborate system of rules to impress them upon their minds; yet there is not a train service man of any considerable experience who can truthfully say that he has never deliberately disobeyed these principles.

"Safety-first" means simply a consistent, proper and efficient performance of our duties. . . . In our investigations of train accidents we have found numerous cases where special rules have been promulgated, establishing conflicting standards for the control of like situations, and we have found many cases where certain operating rules have been permitted to fall into complete disuse, only to be revived for disciplinary purposes in case of accident. In some cases operating rules have, by common consent, been held to have no application to particular cases until they were practically forgotten, and then have been resurrected and advanced as justification for inflicting discipline upon employees because of an accident which occurred on account of their non-observance. One case of this kind I will mention, because it occurred on a "safety-first" railroad.

[Mr. Borland here recounted the circumstances of the collision of passenger trains at Terre Haute, January 8 last, reported in the *Railway Age Gazette* of May 9.]

It was thoroughly established that nobody had been expected to protect the rear end of a train by a flag when it was standing where this train was standing, but the conductor



of the standing train was censured for not protecting by flag, as required by rule 99. It is discipline of this kind that creates resentment in the minds of employees and destroys their confidence in the justice of their officials, which confidence must be the basis of that co-operation and harmony essential to efficient and safe railroad operations.

The word discipline has a sinister meaning for most railroad men. There are several definitions to this word. One is "instruction and government, comprehending the communication of knowledge and the regulation of practice; the training to act in accordance with rules." Another definition is "correction, chastisement, punishment, inflicted by way of correction and training; instruction by means of misfortune, suffering and the like." Railroad employees have had ample experience with the latter kind, but they have had altogether too little of the former, which fact will explain their repugnance to the term.

Discipline is absolutely necessary to the success of any organization where individuals must work together for a common end. It is especially necessary in railroad service, where the safety of human life is at all times dependent upon the proper action of some individual. But discipline does not mean simply tying a can to a man whenever he does something wrong. It means educating and instructing him to act in accordance with proper rules, so that he will learn to do the right thing as a matter of habit. It means the creation in his mind of a feeling of confidence in the justice of the governing body. . . .

Of course it cannot be expected that ideal discipline will burst forth upon us full blown, especially in view of the improper methods that have long generally prevailed throughout the country, but this safety first movement is pretty good evidence that there has been an awakening. . . .

### TRAIN ACCIDENTS IN OCTOBER.<sup>1</sup>

Following is a list of the most notable train accidents that occurred on railways of the United States in the month of October, 1913:

#### Collisions.

Date.	Road.	Place.	Kind of Accident.	Kind of Train.	Kil'd.	Inj'd.
2.	St. Louis S. W. ....	Stephens.	bc	F. & F.	4	3
2.	Yazoo & M. V. ....	Hollywood.	bc	P. & F.	1	1
3.	N. Y. Chi. & St. L. ....	Fairview, Pa.	bc	F. & F.	2	1
6.	Balt. & O. ....	Summerfield.	rc	P. & F.	2	2
*5.	Great Northern ....	Ulm, Mont.	rc	F. & F.	2	0
9.	Southern .....	Grand Junc.	rc.	P. & F.	1	18
†10.	N. Y. N. H. & H. ....	Westfield, Conn.	bc.	P. & P.	1	10
20.	Penn. ....	Portville, N. Y.	xc.	F. & F.	2	3
22.	Seaboard A. L. ....	Gaston, S. C.	bc.	P. & F.	0	15

#### Derailements.

Date.	Road.	Place.	Cause of Derailm't.	Kind of Train.	Kil'd.	Inj'd.
2.	Penn. ....	Garland, Pa.	b. rail	P.	0	7
8.	Chi. Mil. & St. P. ....	Ingomar.	beam	P.	0	20
10.	C. C. C. & St. L. ....	Columbus.	acc. obst.	P.	2	0
12.	Atlantic C. L. ....	Live Oak.	exc. speed	F.	1	3
†13.	Mobile & O. ....	State Line.	unx.	P.	17	90
19.	Atlantic C. L. ....	Green Pond.	malice.	P.	1	4
19.	C. C. C. & St. L. ....	Tiffin.	.....	P.	0	28
19.	Chi. & Alt. ....	Alton, Ill.	d. track	P.	0	15
27.	Southern ....	Easley.	.....	P.	1	3
31.	Texas & P. ....	Alexandria.	malice.	P.	0	4

The trains in collision near Stephens, Ark., on the 2d, were a southbound freight train and a northbound train consisting of an engine and a pile-driver car. Both engines and 12 cars were badly damaged. Three trainmen and one laborer were killed

and three trainmen were injured. The cause of the collision was the neglect of the freight to wait at Stephens, as ordered.

The trains in collision at Hollywood, Miss., on the 2d, were southbound passenger No. 15 and the northbound freight. The passenger train ran over a misplaced switch and into the head of the freight, which was standing on a sidetrack. The fireman of the passenger train was killed and the engineman injured. Many passengers were badly shaken up and bruised. Both engines and four cars of lumber were badly damaged.

The trains in collision at Fairview, Pa., on the night of the 3d, were through freights. Two trainmen were killed and one injured. The eastbound train had passed a signal set against it.

In the collision near Ulm, Mont., on the 5th, a train consisting of an engine and one car ran into the rear of a preceding freight, wrecking the caboose and two empty stock cars, which took fire and were burnt up. The conductor and one brakeman of the freight were killed and their bodies badly burnt. There was a blinding snowstorm at the time. The freight was moving about 6 miles an hour, and was not properly protected.

The trains in collision at Summerfield, Ill., on the 6th, were westbound passenger No. 3 and a westbound freight. There was some fog at the time. The freight was entering a sidetrack; it was run into at the rear by the passenger and the passenger engine was overturned. The engineman of the passenger and a trespasser stealing a ride were killed and two other trespassers were injured. The cause of the collision was neglect of flagging on the part of the freight and excessive speed, under a permissive signal, on the part of the passenger train.

The collision on the Southern Railway at Grand Junction, Tenn., on the night of the 9th, was due to a misplaced switch. The eastbound "Memphis Special" running at full speed crashed into a freight train standing on a sidetrack. The engineman was killed and 14 passengers, one employee and three postal clerks were injured; nearly all of the injuries were slight.

The trains in collision near Westfield, Conn., on the evening of the 10th, were an eastbound passenger consisting of two cars and a locomotive, running backward, and a westbound passenger train consisting of one electric car. This was a butting collision on a straight line, the electric cars using this part of the line regularly. The electric car was wrecked and one passenger was killed and ten were injured. The electric car had passed its regular meeting point. The motorman was indicted on a charge of manslaughter.

The collision at Portville, N. Y., on the 20th, was between a light engine and train No. 95, both northbound. It was at the passing siding. Two student brakemen were killed, and one engineman, one fireman and one brakeman were injured. The light engine and train No. 95 had been on the siding waiting for train No. 58 to pass. After this train had passed, the light engine was given orders to run ahead of train No. 95 and backed out the south end of the siding to the main track; then, while running north at a speed of about 15 miles an hour, it struck the tender of the engine of train No. 95 at the north switch of the siding, due to the engine of the latter train fouling the main track.

The trains in collision near Gaston, S. C., on the 22d, were northbound passenger No. 20 and a southbound freight, and seven passengers and eight trainmen were injured. The collision was due to misreading of orders by the men in charge of the freight.

The train derailed at Garland, Pa., on the evening of the 2d, was westbound passenger No. 41. The cause of the derailment was a broken rail, and all of the cars went into the ditch and lodged against the side of a cut. Five passengers, one employee and one other person were injured.

The train derailed at Ingomar, Mont., on the 8th, was the eastbound Columbian express. The train was traveling at regular speed and four cars were ditched. The cause of the derailment was a broken brake beam on an express car. Twenty passengers were injured.

The train derailed at Columbus, Ohio, on the 10th, was west-

<sup>1</sup>Abbreviations and marks used in Accident List:

rc, Rear collision—bc, Butting collision—xc, Other collisions—b, Broken—d, Defective—unf, Unforeseen obstruction—unx, Unexplained—derail, Open derailing switch—ms, Misplaced switch—acc. obst., Accidental obstruction—malice, Malicious obstruction of track, etc.—boiler, Explosion of locomotive on road—fire, Cars burned while running—P. or Pass., Passenger train—F. or Ft., Freight train (including empty engines, work trains, etc.)—Asterisk, Wreck wholly or partly destroyed by fire—Dagger, One or more passengers killed.

bound passenger No. 41. The engine was overturned and the engineman and fireman were killed. The train while running at moderate speed struck a hand-car.

The train derailed near Live Oak, Fla., on the 12th, consisted of a locomotive and a caboose. The engineman was killed and three other trainmen were injured. It is believed that the derailment was due to excessive speed.

The train derailed near State Line, Miss., on the 13th, was a westbound passenger train, the second section of No. 4, carrying soldiers. Seventeen soldiers were killed and 90 were injured. An officer writes that the cause of the derailment was not discovered. The track was found in good condition and the train was running at moderate speed.

The train derailed near Green Pond, N. C., on the evening of the 19th, was northbound passenger No. 86, and the locomotive was overturned. The fireman was killed and the engineman and three other persons were injured. The cause of the derailment was due to a partly open switch. It is believed that it had been maliciously tampered with.

The train derailed at Tiffin, Ohio, on the 19th, was a northbound passenger, and the engine, baggage car and two coaches fell down a bank. Twenty-eight passengers were injured, three of them seriously.

The train derailed near Alton, Ill., on the morning of the 19th, was a southbound passenger, and three passenger cars were ditched. Fifteen passengers were injured, two of them seriously. The derailment is believed to have been due to irregular track.

The train derailed near Easley, Ga., on the 27th, was passenger No. 11 and the engine and all of the cars, except one, were overturned. The engineman was killed and the fireman, baggageman and express messenger were injured.

The train derailed on the night of the 31st, near Alexandria, La., was westbound passenger No. 53, and the baggage car and two passenger cars were overturned. Five passengers were injured, none very seriously. The cause was an unfastened switch which had been tampered with by some person unknown.

**Electric Roads.**—In a collision on an electric road near Dallas, Tex., on the 14th of October, four persons were killed and twenty injured. A freight car broke away from a train ascending a grade and then ran back down hill into the head of a passenger car.

**Canada.**—In a collision between a freight train and a work train on the Canadian Pacific near Weyland, Ont., on the 21st, five employees were killed and seven injured. It is said that the work train had entered the main line between the first and second sections of the freight, when, according to the order issued by the despatcher to the conductor and engineman, it should have waited on the sidetrack until both sections of the freight had passed.

**FLOOD DAMAGE IN ARGENTINA.**—The recent flood rains, although good for the crops, have somewhat disorganized the services on some of the Argentine railways, the Buenos Ayres Great Southern Railway probably suffering the most. In spite of the damage done, the engineering staff of the line very creditably effected temporary repairs to the washouts, so that traffic was resumed with but little delay. All the long distance day and night trains have now resumed their usual itinerary from the terminal station, Plaza Constitucion. The Central Argentine Railway still continues to show great expansion in its traffic, recording substantial increases each week. Passenger traffic has recently been particularly heavy owing to the excursions connected with the various fiestas, races and shows, held at many points on the line. For example, a record crowd visited the Argentine Derby at the Palermo race course, and on the Tigre branch over 5,000 passengers were transported to the Spanish "Romerias" at Saavedra. The traffic to the Argentine "Henley" also helped to swell the crowds, but in spite of the great rush the traffic department had no difficulty in carrying out the arrangements in a manner satisfactory to all concerned.

## NEW STEEL JOURNAL BOX.

McCord & Company, Chicago, have just placed on the market the new combination pressed steel and cast steel journal box shown in the illustration. The pressed steel cellar and the cast steel top are made integral without the use of rivets or any other attachments that could be loosened by vibration in service. This



Combination Pressed Steel and Cast Steel Journal Box.

box is the result of many years of experience in journal box manufacture by this company and it is believed by the makers that it will meet all the demands of steel journal box requirements.

## TALK WITH PASSENGERS, NOT AT THEM.

An award of \$25 for the best essay submitted by the agents of the Baltimore & Ohio on "How a Ticket Agent Should Handle an Undecided Inquiring Caller" has been awarded to Elias Bernstein, ticket agent of the Staten Island Railroad, at Pleasant Plains, Staten Island, New York City. This is the New York division of the B. & O. Numerous other papers were voted honorable mention and will be placed in the hands of agents along with the prize essay. Mr. Bernstein says, in part:

"Whether it be on the road with the merchandise or behind the ticket counter, the salesman must have at his command a thorough knowledge of his business and an understanding of human nature.

"It is a great art to handle a man in such a way as to win both his trade and his friendship. A living man is the most complex piece of machinery in the world. Compared to him, a locomotive is a play toy. The slightest blunder may cause him to work badly or to break down; yet there are no printed directions attached to him. All we can do is to watch his eyes and do our best.

"Now let us suppose a case of an undecided caller. He wants to know what advantage our road has over another which also runs to his destination. Certain golden rules must be closely adhered to. The first greeting from the agent must be a sunny smile. He must listen attentively and study the brand of information desired.

"Since first impressions are very lasting the company's servant must have at his fingers' tips the facts and figures. It must also be kept in mind that it is easier to win a man through his eyes than his ears. Diagrams and maps are very helpful and speak for themselves. You can never win a man by talking at him; you must talk with him."



## Maintenance of Way Section.

THE first severe storm and cold snap each fall finds a number of roads unprepared for winter, and because of its uncommonly early arrival the effect of the storm of last week was more pronounced than usual. In spite of the very generally recognized detrimental effects of delaying the renewal of ties, heavy surfacing and other work which should properly be done during the summer months, many roads continue to postpone much of this work until the last minute. The primary difficulty lies in most instances with the higher officers, who withhold material and labor in the spring, but it is not entirely confined to them. The supervisor, in distributing his material and labor, also has an important influence. By a careful and intelligent distribution he can do much to facilitate the work throughout the season and thereby decrease the amount remaining to be done in the fall. By studying the cost of the work done at this season of the year, the savings made by doing things at the proper time should be made evident. The past few weeks have been favorable for track work and where proper advantage has been taken of the conditions, the track will go into the winter in excellent shape. At the same time, this favorable weather has been utilized in many instances to put in ties, to do heavy surfacing, etc. While there is a gradual improvement throughout the country in this matter, it is not as general as it should be, and there is still much to be desired. The time to begin to avoid fall work is in the spring, and the results of needless delays can be best observed at this season.

EVERY division engineer and supervisor has occasion to require the services of a work train frequently. Many have one or more under their control all the time. The proper handling of these trains to secure the greatest benefits is, therefore, a matter of general interest. Maintenance men many times complain that they are unable to secure work trains from the operating department as frequently as they desire. At the same time, it is not uncommon for trains to be called out to do work which can be handled more economically by other means, especially if delays to traffic are considered. The relative economy of regular, as compared with occasional employment of work trains depends primarily upon the amount of work to be done. When a train is secured it must be supplied with sufficient, but not too many men, and must be under the direction of an experienced foreman or work train conductor. The job must be planned carefully so that no time will be lost, for the overhead charges are high. These and many other important considerations enter into the economical handling of work trains. To secure a full discussion of this important subject we announce a contest on the "Proper Handling of Work Trains," in which we hope to receive a number of contributions describing the ways in which work trains are, or should be handled and manned, their uses and their abuses, their relative economy for various things and other considerations to which the supervisor should give weight in this connection. We will pay \$25 and \$15 for the two best papers received, and our regular space rates for all other papers accepted and published. All contributions should be sent to the Engineering Editor, *Railway Age Gazette*, 608 S. Dearborn street, Chicago, by December 27, in order to be considered by the judges of this contest.

ON May 12, 1913, an Oregon-Washington Railroad & Navigation Company train was derailed near Lakeview, Wash.,

while running over the tracks of the Northern Pacific, the result being the death of four, and the injury of seven persons. As this derailment was directly attributable to defective maintenance practice, we will review the details as reported by the chief inspector of safety appliances to the Interstate Commerce Commission. At the time of the accident the section men were engaged in the renewal of ties, and an examination of the track showed that within a distance of 16 rail lengths 46 ties had been placed. Very few of these ties had been spiked, the number unspiked under adjoining rails being respectively, 4, 7, 4, 7, 2, etc. Of the 7 ties under one rail 5 out of 6 successive ties were unspiked, while on another rail 4 out of 5 successive ties were unspiked. The conclusion was drawn by the inspector that the section men had started at one end removing the spikes and ballast from the ties to be renewed, and had then started in again at the same end taking out the old ties and putting in new ones, intending to complete the ballasting and spiking of the new ties after all of them had been placed in the track. When the engine hit this track at an estimated speed of 60 miles an hour, which was allowable under the rules on this division, it began to rock and placed sufficient outward pressure upon the rail to push it out and turn it over, derailing the train. The rules on this road, as on most roads, leave the matter of flagging to the judgment of the individual section foremen, and the foreman in this instance was an experienced man who had been in charge of section and extra gangs for 29 years. The serious results arising from error in judgment on his part indicate the importance of proper instruction of the foremen by the road-master regarding the necessity for proper flagging as well as for proper handling of track work in order not to introduce any unnecessary elements of danger, as was done in this case by weakening the track to the extent that was done.

A SUBJECT which is now being forced upon the serious attention of railway engineers in a number of states is that of clearance. There has been in the past some hesitancy to discuss this matter freely, but it would seem that the time has come when the railways can unite to eliminate clearances which are now generally recognized as not conforming to good railway practice. Such action would do much to prevent unfair legislation in this direction. The greater number of obstructions that now exist within recognized clearance limits were placed there years ago when construction standards were far below their present level. Such obstructions are gradually being removed as the facilities are being rebuilt and improved, but in a few instances new work is being put in without reference to proper clearance, where the only objection to observing the recognized standards is that the cost would be slightly increased. Many roads have spent large sums of money to increase their clearances, but others have given the subject very little serious consideration and are not only allowing present obstructions to remain, but are actually building new structures or allowing private industries to build them, which interfere with standard clearance. The obvious result of such action, as shown by previous experience, is legislation intended to enforce standard limits, but usually more radical than conditions require, thereby imposing unnecessary restrictions upon the roads. Several states, including California and Minnesota, have already passed clearance laws, and numerous bills have been presented in other states. As an example of the unfair provisions which may be incorporated in such laws, the standard clearance diagram which is fixed by the Minnesota statute is rectangular in shape. If this law is enforced it will remove all

cattle guards, many through and half-through plate girder structures, through truss portal bracing, etc. If other states follow the lead of those that now specify railway clearance, the standards will vary widely and the railways will be forced to appeal for federal legislation to harmonize the conflicting requirements, when the entire subject might have been settled and considerable expense and annoyance avoided if the railways had but agreed among themselves and decided to put into force the clearance diagrams that are now found in the proceedings of their associations.

#### BRIDGE INSPECTION METHODS.

THE importance of frequent and thorough inspections of all bridges carrying trains is fully appreciated by railway officers in charge of their maintenance and few persons outside of railway service realize the amount of attention these structures receive. It is largely for this reason that the methods and frequency of inspection on different roads vary according to the ideas of those in charge regarding the best means of insuring the proper maintenance of structures and the prompt discovery of defects. To afford an opportunity to compare these methods on the leading roads, the practice of several representative roads is presented in another column.

The practice of requiring the section forces to inspect structures casually as they pass over them daily and to report immediately any evident defects, is common to all roads. Likewise, it is customary for a monthly inspection of all bridges to be made by the local division forces. On some roads the master carpenter is expected to do this work in connection with his other routine duties. On other roads one or more inspectors are assigned to each master carpenter and spend their entire time on inspection work. Where the number of structures is large enough, or where their condition requires careful attention, it would seem that the latter method would insure a closer and more careful inspection, as these men become more experienced in this line of work and possess a more accurate knowledge of the actual condition of the individual structures on the division. Whether the inspection is made by the master carpenter or the division inspector, it is frequently difficult to secure the careful inspection necessary and the work may become more or less mechanical in nature. With the result that defects not readily observed, but nevertheless serious, may be allowed to develop.

To secure a good check on the thoroughness of the division inspection, the Lehigh Valley and Pennsylvania employ inspectors who examine all structures on the road at stated intervals. These men report directly to the general officers, and work independently of the division forces. By comparing the reports of the general inspector with those of the division inspectors, lax inspection can be readily detected and the general efficiency of all inspections can be raised.

An annual inspection by the chief engineer, bridge engineer or their immediate assistants is also common to most roads. The thoroughness of this inspection, however, varies from the casual inspection of all structures to the detailed inspection of those structures which it is thought are in most need of immediate attention. In the matter of forms, some roads enumerate in detail the points to be considered by the inspector, and he reports on each one of these. On some other roads, as the Lehigh Valley, the form is simple, and the inspector reports the condition of the various portions of the structure in his own words. Each method has its advantages.

We have secured descriptions of those in use on the Lehigh Valley, the Grand Trunk, the New York Central & Hudson River, the Missouri Pacific, the Southern Pacific, the Pennsylvania Railroad and the Chicago, Burlington & Quincy.

## Letters to the Editor.

### THE TECHNICAL GRADUATE HERE AND ABROAD.

SPOKANE, Wash., November 11, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

In one of the northwestern states an engineering party were engaged in location work for a new railroad, and a bright appearing young chap, of Greek or Latin origin, was given an important position on account of his fine technical education. His inability to handle the English language, however, worked against him, and he was soon succeeded by a young American. He was offered a minor position of "stake artist" or chainman, but this he indignantly refused, and left camp immediately and abruptly.

His opinion of the American engineer, in general, as given in the letter which he wrote to the chief after his departure, is in true Japanese schoolboy fashion, and shows that, so far as English composition is concerned, H. Togo has "nothing on him."

Sir:—I write you this lines not to ask you for job, because man of such superstition like you do not admit of the state of anybody else except himself and his religious peoples. I only want to give you an idea about me and old country students and schools, compared with the education and school of this country. When I tried 5th degree (elementary schools) I choised technical schools—and my first work that had in wass to became handy to use levels, transit, bars meters, plain tables, gradient, studia, ect., ect., with all requirements of mathematic work very cimple; that time I was masster of that. At this country man carry a tube of that sort upon his scholder is classified and called ENGINEER—At old country work of that kind can to be done by any man of good sense, only neede to have manual training in handling cogarithm tabels and trigonometric function tabels—I know to have curves, crossovers, spirals, ellipse, cycloid and so on, ect., from 10 years ago with the use of pur Geometry—and arithmetic. After 2 years of that kind of practise then in some school I tooaked coarse of phisicks and mathematics, masonry and structures, very hard work, and thus work was done before I entered the University where I have the large complicate experimental work; and I have had 2 years in Civil Industrial Engineering, and I can prove that either a professor of any university in this country don't know of his subject much as a poor student of old country universitys know to have. What I want to say—that men are titled here Engineer are compared with the fallows that start the work in Geometry and get handy in instruments. The meccanical and Electrical Engineers are as good meccanics of old country. Why I am in this conditions is from misfortunes. And because I been work between gelous peoples where they cut me chance to go ahead, and why never I had acquaintance and pol of somebody else like any one else have and why never I had to say principle man for job. Other ways the instinctive odii of races do not permit the amalgamation with some kinds of peoples. IF I WAS of different origin perhaps might I could have now good position. But if you, honorable chief, wass a gentlemen of my blood, perhaps instead to give another man command of that work you would to give to me because of some of your same blood and it is why your peoples keep gone and rappresent on jobs. You could say me in that condition why don't gone back at the old country. I must answer that we gon make this our country more better than you do. If you mind that our immigration in this land begun 20 yrs. ago and examining and comparing you find to have the progress, development better than any colony.

You told me that I can to obtain job as Chainman, steak man. In regard of that I can tell you that not one of your people can to determine exactly the degree of latitude and longitude in which your famous line gon be built. The people chaining, steaking of that kind of experience in old country belong to a common class. Don't you think me a man of that kind, please. *The suit close do not make no man!* Here you figure that way, but it is false! What I know of English is knowh to me for my work to judge a man you must practice man first.

Keep you onyour career with all bunch and remember that when some old country man look for job is not master leveler, transit, ect., but is man of porfessional training, and good to. And you insted to send this man chain, steak, ect., you send your engineers chain, steak, ect., with him. Your country is infested of many civil engineers like Salvation Army do; but I could make contest they don't yet understand what is to know for civil engineer. But man with brass pipe, high top shoes and flat hat he is Civil Engineer in America. The bigottism the preachers that I lived at towns of France and Italy I find here between your peoples and all ignorants.

Truly yours,

F. LEONARD.



# METHODS FOR THE INSPECTION OF BRIDGES.

Description of the Systems in Use on Seven Representative Roads for the Periodic Examination of All Structures.

## ON THE LEHIGH VALLEY.

By F. E. SCHALL,  
Bridge Engineer, Lehigh Valley.

The Lehigh Valley is divided into six operating divisions, with a division engineer, a supervisor of bridges and buildings, and a bridge inspector on each division, except the Buffalo division, where, on account of its large mileage and number of bridges, two bridge inspectors are employed. The division bridge inspectors go over their territory constantly inspecting the structures. The supervisor of bridges and buildings and the division engineer are also required to make inspections of structures at certain periods, and besides this, the supervisors of track and the track foremen are required to inspect the structures on their respective territories. In addition, a general bridge inspector is employed to inspect structures, following up the division bridge inspectors' reports on certain defects and making a general fall bridge inspection on the whole system.

The mileage of main line and main track of branch lines on each division is as follows:

New York division .....	22.08 miles
New Jersey & Lehigh division .....	227.20 miles
Wyoming division .....	310.59 miles
Buffalo division .....	331.09 miles
Mahanoy & Hazleton division .....	201.87 miles
Auburn division .....	302.30 miles

Under the instructions governing the inspection of bridges on this railroad, the bridge inspector, reporting to the division engineer, is to make a careful inspection of all arch culverts, bridges, trestles and highway bridges on his division at least every two months, and special additional inspections of such of the structures as under load show undue vibrations or other irregularities, defective members, settlement or other defects requiring more frequent inspection. The bridge inspector is to observe the action under moving loads of all old bridges and trestles, and on bridges and trestles that show slight defects, to ascertain whether there is any excessive vertical deflection or side motion in the bridge. He is to note the track to discover any undue deflection in the surface of the track on any part of the bridge or trestle to ascertain the cause of such irregularity, and to make a concise report on the same. He is also to observe the action of all other arch culverts, bridges, trestles and highway bridges under moving load as often as opportunity offers.

The bridge inspector reports on each bridge separately on the day of inspection on a specific blank, divided into three parts, the upper space for the entering of conditions or any defects found, in the inspector's own language, the middle space for the entering of data as to the work to be done to maintain the structures in good condition, and the lower space for noting any work that must be done to keep the structure safe or any action taken by the inspector pending the regular repairs or attention by the bridge forces. In cases requiring prompt action, a telegraphic report is made to the division superintendent, the division engineer and the supervisor of bridges and buildings, followed by the regular daily report. The division superintendent makes a telegraphic report to the engineer, maintenance of way, and to the bridge engineer of any urgent case, describing the conditions which may have been found with a statement of such action as may have been taken. The bridge inspector shall, if conditions require, stay at the bridge to protect the trains and traffic until he is relieved.

In addition to the work of the bridge inspector, the supervisor of bridges and buildings is to make an inspection of all culverts, bridges, trestles and highway bridges on his territory every six months, making a report on the condition

of the structures to the division engineer. The foreman carpenter while at work at or near such structures is to inspect them as opportunity offers and report conditions found to the supervisor of bridges and buildings. The track supervisor and track foremen are also charged with the duty of inspecting all culverts, bridges, trestles and highway bridges on their respective territories, noting particularly the surface and tamping of tracks on bridges and approaches, the spiking of tracks and guard rails, any settlement causing shifting of tracks, rubbish in creek channels, undermining of foundations, cracking of walls, etc., the supervisor of track reporting conditions to the division engineer.

The track foremen are especially charged to inspect all structures each month and oftener if necessary, especially after heavy storms, rains, etc., to note any defects in the masonry of culverts, bridges, highway bridges and the supports of trestles, removing promptly any rubbish collecting around openings; to notice any undermining of foundations, stopping up of culverts, settlement of tracks on approaches to bridges, surface and alinement of track over bridges, and to make monthly report in duplicate on a specified form furnished for that purpose, sending one copy to the supervisor of track and one copy to the division engineer. The section forces once every month clean all bridge seats, tops of chords, girders and other parts of bridges of any ballast, cinders, dirt and rubbish.

A monthly report of the result of the bridge inspectors' work is compiled by the division engineer on form M.W.50 and sent in triplicate to the division superintendent, who sends one copy to the engineer maintenance of way and one copy to the bridge engineer. The division engineer also makes an inspection of all arch culverts, bridges, trestles and highway bridges at least once every six months, and oftener if the conditions at any structure are such as to require it. He keeps closely informed from the reports received and confers with the bridge inspector as often as opportunity offers, in regard to the condition of the structures and the work necessary for their proper maintenance.

The division engineer is in charge of and is responsible for the proper and safe condition and maintenance of all structures. He is to see that his instructions are carried out promptly, that all necessary repairs are made in rotation of urgency, that the work is of good quality, that during periods of construction and repairs proper precautions are taken to prevent accidents and that the work is kept in a safe condition for the traffic.

The general bridge inspector, reporting to the bridge engineer on form C. F. 9, makes an inspection of culverts, bridges, trestles and highway bridges upon which defects have been reported by the division bridge inspector, or on other structures, as conditions may arise. Reports are made in quadruplicate, one copy for the general bridge inspector, one for the bridge engineer and two are sent to the chief engineer, who transmits one copy to the engineer maintenance of way. The general bridge inspector's work is in no way to interfere with the division bridge inspector's work, but is intended to bring the bridge engineer, and through him the chief engineer, into closer touch with the condition of the various structures, to follow up the carrying out by the division forces of any recommended work and to have first hand detail reports of any defects in structures reported by the division bridge inspector.

In addition to the above, the general bridge inspector makes a regular fall bridge inspection of the whole system, using an engine and car, the division engineer, supervisor

of bridges and buildings and the division bridge inspector accompanying him over their territories, inspecting all arch culverts, bridges, trestles and highway bridges, noting any defects requiring attention, either at once or during the coming season, also noting any renewals required in timber structures, wooden floors for iron and steel bridges, painting of structures, pointing or other repairs to masonry and bridge seats, strengthening foundations, surfacing of tracks on approaches to bridges, planking and other repairs to highway bridges, fences and other protection on structures, etc. A typewritten report of such fall bridge inspection is made for each division and triplicate copies sent by the bridge engineer to the chief engineer, who transmits two copies to the engineer maintenance of way, one for his files and one for the division. Monthly statements of work done by the division forces on repairs to bridges and trestles, etc., are sent by the division engineer to the engineer maintenance of way, who transmits one copy to the bridge engineer for his information and for the checking up of the work outlined in the fall bridge inspection reports. The inspections made by the general bridge inspector or any inspection made by the bridge engineer do not in any way relieve the division engineer, the supervisor of bridges and buildings or the division bridge inspector of any responsibility or obligation to carry out all the rules and regulations relating to the maintenance of all arch culverts, bridges, trestles, highway bridges and other structures in a safe condition.

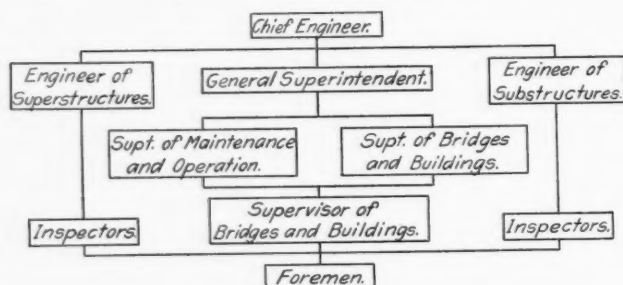
#### ON THE GRAND TRUNK.

By M. S. BLAICKLOCK,

Engineer, Maintenance of Way, Grand Trunk.

This railway is divided into three grand divisions, 12 ordinary operating and maintenance divisions, and 33 districts. Each grand division has a general superintendent, superintendent of track, superintendent of bridges and buildings, and a division engineer. Each operating and maintenance division has a superintendent, resident engineer, supervisor of bridges and buildings and several supervisors of track.

The organization in regard to maintenance and inspection of bridges is graphically illustrated below:



Graphical Outline of Grand Trunk Bridge Organization.

Each operating and maintenance division is a complete unit within itself, reporting to the chief engineer through the general superintendent.

There are two methods of inspection of bridges, one originating with the chief engineer and the other with the division superintendent. The first is done annually and the second periodically, the degree of frequency depending on the importance of the structure, but it is never less than once a year.

Besides the chief engineer, the staff at headquarters is composed of an engineer of superstructures and an engineer of substructures, together with one inspecting engineer for each grand division. When a general inspection is undertaken a gasoline motor car is used, and a party, consisting of the inspecting engineer, superintendent of bridges and buildings of the grand division and the division supervisor of bridges and buildings, makes an examination of each structure. The results of the inspection are kept in field note books, although not in any special form, but on the comple-

tion of the inspections, they are tabulated at headquarters on the following form:

					Bridge No.
Mile from	District	Description			S. or D. Track
Number of Spans	Length of Steel	Distance between back walls	Depth	Specification Loading	Remarks
Date of last Inspection					Remarks

These reports are typewritten on stiff cardboard and filed with a photograph of the structure in cases in numerical order of the districts, for reference in the chief engineer's records. Towards the end of the year, after the inspections are completed, such renewals and repairs as may be required during the ensuing year are considered and determined. Classification is made into new superstructure, new substructure, general changes and general repairs, plans and estimates for such are made accordingly, and contracts awarded in the usual course. The character of the work necessary to maintain, strengthen or replace is made by the structural engineers from the inspectors' reports and recommendations are made to the chief engineer, who forwards them with his recommendation to the executive officer.

In addition to the annual inspection by the chief engineer's staff, there are periodical inspections by the supervisors of bridges and buildings on each division. These supervisors are chosen from the foremen of the bridge and building department and have usually spent their working lives in the same department. As we do most of the renewal of bridges with our own forces, their training is one of actual experience, and they have usually demonstrated their ability in the years they have spent in construction. The supervisors are provided with small motor cars and inspect each structure thoroughly four or five times per year. The results of their inspection are recorded on the following form:

#### GRAND TRUNK RAILWAY SYSTEM.

..... Division.

#### ANNUAL BRIDGE INSPECTION REPORT.

I have today inspected Bridge No.....District.....at Mileage....., and find its condition as follows:

- |                      |                          |
|----------------------|--------------------------|
| 1. Ties              | 14. Bottom Bracing       |
| 2. Guards            | 15. Sway Bracing         |
| 3. Stringers         | 16. Wall Pl. or Pedestal |
| 4. String. Conns.    | 17. Expansion Joint      |
| 5. Floor Beams       | 18. Bearings             |
| 6. Floor Beam Conns. | 19. Masonry              |
| 7. Girders           | 20. Caps                 |
| 8. Top Chord         | 21. Piles or Posts       |
| 9. Bottom Chord      | 22. Sills                |
| 10. Ties or Rods     | 23. Line                 |
| 11. Posts            | 24. Camber               |
| 12. Truss Joints     | 25. Paint                |
| 13. Top Bracing      | 26. Miscellaneous        |

The following is required to maintain the structure in good condition:

Date.....19... Supervisor.

These reports are filed in the supervisor's office, and duplicates are sent to the superintendent of bridges and buildings and superintendent of operation and maintenance. The superintendent of bridges and buildings refers to these reports



when making the annual inspection with the chief engineer's inspectors and the conditions as shown on these reports form the basis for the official records on the unit bridge card system on file in the office of the structural engineers.

The advantage of this system of inspection is that we have the assistance of the practical man who often has had direct charge of the construction and erection of the structure, as well as the maintenance in addition to the practical as well as the theoretical experience of the superintendent of bridges and buildings, to advise and explain to the inspecting engineers and the structural engineers the precise nature of the weaknesses or defects, as well as the physical condition of the structure in service.

The advantage of the unit card filing system of the reports is its convenience for ready reference.

#### ON THE NEW YORK CENTRAL & HUDSON RIVER.

By A. W. CARPENTER,

Assistant Valuation Engineer, New York Central & Hudson River.

The most frequent inspection is that of the trackmen. This is made daily or oftener by the track walkers and patrolmen and somewhat less frequently by the section foremen. The inspection by these men is of course more or less superficial, but is sufficient to take care of accidents, washouts and other obviously wrong conditions, which do not require trained observation and special knowledge of construction. The track supervisor is required to make a personal examination of every tunnel, bridge, culvert, trestle, retaining wall and sea wall upon his division during each quarter of the year, and on the last day of each quarter to render a report to the division engineer, calling attention to any structure or wall that he considers to need attention in the near future. All employees are required to report immediately any conditions that they may observe which in their judgment are unsafe, taking immediate steps to insure safety until their reports are acted upon.

Each maintenance division employs one or more bridge inspectors reporting to the bridge supervisor. These inspectors are generally recruited from the bridge gangs, and are chosen for their practical knowledge, general intelligence and reliability; sometimes young engineers with proper experience and otherwise qualified are chosen. The bridge inspectors are expected to devote their entire time to the examination of the bridges and culverts in the territory assigned to them, covering all of them at least once during each quarter of the year, and to render a report to the bridge supervisor at the end of each quarter. Instructions to bridge inspectors are contained in the "Rules of the Maintenance of Way Department," the general instructions, aside from those to the effect mentioned above, being as follows:

"In case the bridge inspector finds conditions which he considers dangerous or demanding immediate attention, he shall immediately report it to the supervisor of bridges by letter or telegram as he may deem advisable, and he may call on any employee of the maintenance of way department who may be at hand for necessary assistance.

"Notes of inspectors must be recorded at the structure when the examination is made."

One other rule referring to the inspection of the under parts of bridges over steam-operated tracks deserves special comment and reads as follows: "Overhead bridges exposed to locomotive gases shall be frequently examined. Planking must be removed, or other means taken to determine the conditions at inaccessible places. All parts deteriorated shall be immediately reported." The inspection and maintenance of exposed steel work below the floors of such bridges is apt to be neglected on account of the difficulty of removing the bridge floors, for access to the parts beneath, and the inaccessibility of the parts from below. The above quoted special

instructions have been supplemented by circulars intended to insure thorough inspection of these structures, including the measurement of corroded sections, and the tabulation of the measurements for examination in the office. In order to further facilitate inspection and maintenance, the engineer of structures has, in recent years, when designing overhead bridges with plank floors of sufficient width, shown on his plans the plank cut on the longitudinal center line of the floor, a device which is not a new idea, but which is apparently not used as often as it deserves. With this device, only one-half the width of roadway need be disturbed by the removal of planking sufficient for inspection and maintenance work, thus permitting the work to be done without entirely closing the bridge to traffic, under which circumstances it can be much more readily and efficiently accomplished.

Special instructions to bridge inspectors in the "Book of Rules" cover the particular points to be examined, which from previous experience have been found to be those which are most apt to show wear, defects or need of attention.

The bridge supervisor, reporting to the division engineer, is the road official especially charged with the maintenance of the bridges and the handling of the labor and equipment required therefor. In addition to inspecting promptly such bridges as are reported to him for attention by the bridge inspector, he is expected to personally inspect, at frequent intervals, such bridges as are known to be in a weakened or threatened condition and to exercise the necessary precautions for safety.

Supplementing the bridge inspector's work, in the way of routine inspection, a semi-annual inspection is required of the division engineers, accompanied by their bridge supervisors. The second inspection is scheduled to take place during the months of September and October, and calls for a personal examination of all bridges, trestles, turntables, transfer tables, abutments, retaining walls, culverts, tunnels, etc. The bridge supervisor is required, at the conclusion of each examination, to make reports on the proper forms to be submitted, through the division engineer, to the engineer of maintenance of way not later than November 1.

The division engineers prepare from the supervisors' reports and submit to the engineer of maintenance of way their recommendations for repairs and renewals for the succeeding year. The supervisors' reports are also scrutinized by the engineer of bridges of the maintenance of way department, who also examines the division engineers' recommended programs, and makes personal inspection of the more important points reported and of all the structures recommended for repair or renewal by the division engineer. The engineer of bridges brings into the field technical knowledge of construction which is not always possessed by the division officers. The engineer of bridges has a special inspector to assist him.

While the maintenance departments are responsible for the physical condition of the bridges, the engineer of structures of the engineering department is charged with the responsibility of determining their carrying capacity. He maintains records of the construction of the bridges and of the calculated stresses in members of those which are susceptible to such calculation. To him are referred reports from the maintenance engineers to the chief engineer regarding deterioration in or injury to structures, or other conditions requiring his more technical services. To the engineer of structures is referred the determination of strengthening of bridges to meet increased weight of equipment and the preparation of the program for such strengthening. The engineer of structures has an inspector who examines and reports on the condition of structures as specially instructed.

The above method has been in vogue for the past ten years or so and has been found satisfactory.

## ON THE MISSOURI PACIFIC.

BY W. K. WALKER,

Division Engineer, Missouri Pacific, Wichita, Kan.

From the standpoint of railroad officials in charge of the maintenance of structures, it is important that thorough inspections be made and complete records thereof be kept to insure the safety of all structures and to convey to these officers a definite knowledge of the condition of each and every structure under their supervision at the time of inspection. To best accomplish this a definite method and time of inspection is followed on the division under my supervision. The system outlined below is the general method of conducting the inspection of structures on the Missouri Pacific System.

In passing over their track the section foremen observe the general condition of all structures. Once each week, and immediately following heavy rains, they stop and examine each bridge, culvert and channel thereof. This examination is made by going under the bridge and carefully looking over all timbers, piers, abutments, etc. They see that all bents are free from rubbish and all culverts are clear of mud, rubbish, etc. Any unusual condition is reported to the supervisor of bridges and buildings and to the general roadmaster or superintendent at once by telegraph. The decks of all bridges are carefully looked over for any defects, especially of line, surface or low approaches.

The supervisor or an experienced bridge inspector makes an inspection of all structures at intervals of six weeks or two months. He is provided with a motor car to enable him to get to all structures without loss of time. The roadmasters also give attention to the condition of structures while passing over their track and report any unusual condition to the supervisor and general roadmaster at once.

Every six months the bridge engineer or his inspector inspects all trusses, girders, large bridges and other structures which may require such an inspection. They examine the supervisor's notes of past inspections to ascertain if they are carrying out instructions regarding inspections.

Each fall a special inspection is made by the supervisor, at which time each structure is looked over carefully and defects noted. The notes are kept in an ordinary engineer's field book and each structure is listed as follows:

Bridge (Building, culvert or stock yard) No.....	
Location (Nearest station East or North).....	
Mile Post..... Pole..... No. of Panels.....	
Length of Panels..... Kind of Structure.....	

With the above information it is easy to locate any structure having defects which need attention. In making the inspection of bridges the deck is first carefully looked over, defects noted and recommendations made, after which the under portion of the structure is carefully examined, the defects noted and recommendations made. After all structures on the division have been inspected, the notes are sent to the engineer maintenance of way and a joint inspection is made, determining the program for reconstruction and general repairs to be made during the ensuing year.

This joint inspection is made by the engineer maintenance of way or a representative of the engineering department, expert with reference to structures, the division supervisor of structures, and when possible the general roadmaster or superintendent. Copies of the notes taken by the engineering department representative are furnished the division officers interested, the bridge engineer and the engineer maintenance of way. The bridge engineer specifies which items shall be charged to operation and which shall constitute betterment work. All items of betterment work require special detailed authority beyond the regular yearly program. The receipt of the notes covering the joint fall inspection by the division officers interested constitutes authority to proceed with all maintenance items. The division officers under whose charge the structures come are responsible at all times for the proper

inspection being given the structures as they require and to see that the work of repairs is proceeding in accordance with the inspection notes and that structures are being safely maintained.

At the fall inspection all structures are given a very thorough inspection to determine if there are any weak points. The detail of this inspection in part is as follows: Water ways above and below the structure are looked over to ascertain if they are stopped up. High water records are consulted to ascertain if the opening affords ample water way. Ties, guard rails and sway braces are inspected to see that they are sound, properly placed and fastened in place. Particular attention is given to caps, stringers and piling, especially where they bear against each other and where piling enters the ground or water. Where the structure is six years or more old such members as by their position are particularly liable to decay are tested by boring. The holes so made are plugged up as soon as the inspection is completed.

Examination of masonry, piers and abutments is made with special reference to the joints, settlement, imperfect stones, cracks or other defects. Sketches are made and notes kept of cracks opening up or if any settlement or movement is perceptible. Bed plates and rollers are examined to see that they are clean, that the rollers move squarely back and forth with the trusses, that the pedestals take an even bearing on the rollers and that the anchor bolts are holding properly. The condition of all timbers supporting corbels, wall plates or bolsters is carefully observed to note any appearance of crushing or decay. All packing and chord bolts are examined to see that they are tight.

Connections between stringers, floor beams and connecting angles are carefully examined. The inspection of connections between floor beams and trusses is made for evidence of imperfect bearing, or splitting of connecting angles. A test is made for the equality of tension in tee bars and any signs of distortion or crookedness in bars of end panels or bottom chords is looked for. The center line of all tension members is also seen to be the same as the line of strain. The top chords, lateral struts and posts are examined to see that they are straight and free from twists. On wooden bridges the braces are seen to be in place to take square bearing at the ends and to show no evidence of warping.

Lateral connections are examined to see that lateral tension members are straight. An examination is made of all hangers, testing each nut to see that it is tight and all pins to see if there is any indication of the movement of members coupling upon them or if they have loose nuts. All field driven rivets in floor beams and stringer connections and in bottom chord splices are sounded to see if they are tight. An examination of pedestals and similar members is made to see that they do not catch and retain water by reason of not having proper drain holes. A careful examination is made of the line of each truss by the top chord and by points on the floor beams. The camber is noted by the top and bottom chords. Loose rods, braces and any other defects are carefully looked for. All iron structures are examined for rust spots or other indications showing need of paint.

Culverts are examined for cracks, wing walls giving way, undermining, displacement of riprap and in wooden culverts for rotten members.

This method of inspection has been in practice for several years and has proven very satisfactory. By thus keeping in touch with the exact condition of each structure at all times they are safely and economically maintained. Both division and general maintenance officers are in close touch with the condition of all structures and the time elapsing between inspections is so short that any unusual giving way of any member of a structure is quickly noticed and the remedy applied. By frequent inspection and the replacing of only such members of a structure as show signs of failure, we are enabled to get the major portion of the life of each member.



In the case of concrete and steel structures we are enabled to repair any weak points and thereby lengthen the life of the structure at a minimum cost.

#### ON THE SOUTHERN PACIFIC.

By G. W. REAR,

General Bridge Inspector, Southern Pacific.

Bridges, trestles and culverts on the lines of the Southern Pacific are inspected daily by trackwalkers and section foremen; quarterly by bridge and building supervisors, and annually by the general bridge inspector, division engineer and bridge and building supervisor. Certain structures are given special inspections as may be considered necessary.

The daily inspection consists of a casual examination as the track inspectors pass over the road and is intended mainly to disclose any unusual condition that might be caused by accident, high water, etc. No written report is made of this inspection, any defects found being reported to the roadmaster by wire or letter, as conditions may require.

The quarterly inspection is not as thorough as the annual inspection, but is for follow-up purposes and is intended to show what repairs are being made and to see that no defects occur that might prove serious before the next annual inspection. This inspection mainly includes the visible defects and is not intended to cover decay and other defects not readily observed. A written report of this inspection is sent to the assistant chief engineer.

The annual inspection is made at the most favorable time of the year, beginning with the most southerly lines in winter and finishing with the central lines in the fall. This inspection takes up practically all the time of the general bridge inspector and is very thorough in character, showing the exact condition of each bridge, trestle, culvert, etc. The inspectors pass over the road on gasoline motor cars and examine each structure in turn, all inspection notes being entered in a book, copies of which are furnished to the assistant chief engineer, the district engineer and the division superintendent. The book is a bound volume of white prints made from tracings, having pages 5 x 8 in. in size, alternate pages being left blank for notes. The left hand page contains the following information: Number, kind of structure, length, height and date built. Sufficient space is left for full inspection notes, several blank pages sometimes being left for one structure if necessary. Each year the tracings are corrected and new books bound. This results in cutting down a very large amount of the writing in the field and the inspectors have a complete record of the structures before them. During the year, as repairs or renewals are made, notation is made in these inspection books for the information of those concerned.

Culverts are inspected to see that they are not crushed, cracked or stopped up with drift. If the culverts are of wood, the condition of the timber is shown. Trestles are given a thorough inspection, the amount being governed somewhat by the age of the structure. Where considered advisable, the soil is dug away from the piles for about 18 in. in depth before the inspection is started, a list of the trestles to be so treated being furnished the roadmaster in advance.

The tools used for inspection are a steel bar and a brace and  $\frac{3}{8}$  in. car bit. The bar is of  $\frac{5}{8}$  in. octagonal steel about 5 ft. long, is pointed at one end and with a ball  $1\frac{1}{2}$  in. in diameter at the other end. Usually the bar has a rubber grip handle close to the ball end. The timber is prodded with the point of the bar to ascertain the amount of external decay and is struck with the ball end to sound for internal decay. If the sound indicates decay the timber is bored with the  $\frac{3}{8}$  in. bit. Usually the piles are inspected first and a note made of their condition and, if decayed, the amount of sound wood remaining is measured. The condition of the bracing is next examined and then the caps, stringers, ties and guard

timber. The condition of the fire apparatus is noted; also any lack of care in keeping brush or grass cut away.

Steel structures are given a close examination, especially those which are not of recent construction. The rollers and bed plates are examined, the line and surface noted and a close inspection made for loose rivets, nuts, etc. All hitch angles are examined for cracks and, the behavior of the span under traffic is observed. The older and lighter spans are examined closely for cracks, cut pins, etc. On draw-bridges the machinery is looked over and the bridges are opened for a test of the machinery and operation. The condition of the rails and protective devices is also noted; masonry and concrete substructures, arches, etc., are examined for cracks, settlement or undermining and any change in depth of water or direction of current is noted.

Wooden trusses are examined for decay and for structural defects such as sheared splices, cross grained checks, etc. It is customary to mark a structure "good" if nothing is found to be wrong and confine the remarks to those things found to need attention. A short report of the general condition is often made about as follows: "Trestle 12 years old, fair state of repair, probably require renewal in two to three years." From these annual inspection reports the annual budget of repairs and renewals is made and the repair work and small renewals are carried out along the lines agreed upon by the inspector while on the ground. The larger renewals are usually given special inspection and special plans provided by the assistant chief engineer.

One important advantage of this system is that the operating officials and the head of the maintenance of way department are represented on the ground at the time of the inspection and any difference of opinion can be settled with all the conditions before them.

#### ON THE PENNSYLVANIA RAILROAD.

As there are practically no timber structures remaining on the Pennsylvania, the method of inspection in force on this road is designed for steel structures. A master carpenter is assigned to each division, reporting to the division engineer. One or more inspectors are employed on each division, depending upon the mileage and the number of structures, these inspectors reporting to the master carpenters. These inspectors spend their entire time examining structures and a sufficient number are assigned to each division to enable every structure to be inspected monthly. They are taken from the regular bridge gangs and before appointment are either foremen or leading men in gangs.

Each inspector works alone and makes a daily report to the master carpenter of the structures examined. At the end of the month these daily reports are combined by the master carpenter into a monthly report, which is sent to the division engineer. At intervals of three months, copies of the last monthly reports are sent through the division engineer, superintendent and general superintendent, to the engineer maintenance of way that he may be kept informed of the conditions of structures.

In addition to these monthly inspections the division engineer, accompanied by the master carpenter, foreman carpenter and mason, make an inspection of all bridges in April and October of each year. At the fall inspection special attention is given to the repairs and renewals required for the coming year and a program of such work is prepared and submitted for approval.

As a check against the thoroughness of these inspections by the division forces, three special technically trained inspectors reporting to the engineer maintenance of way, spend their entire time making detailed inspections and examinations of the different structures. They visit all structures on the road and are enabled to cover all of the lines east of Pittsburgh at intervals of about every nine months. In making these examinations the general inspectors take the

master carpenters and division inspectors with them whenever possible in order to train them in proper methods of inspection and to secure uniform standards of inspection on the various divisions. These inspectors make recommendations to the engineer maintenance of way, who transmits them to the division officers and then follows them up to see that the recommendations are carried out.

The assistant engineer maintenance of way, bridges and structures, on the staff of the engineer maintenance of way, makes a general inspection of all bridges on the lines east of Pittsburgh with the division engineer, master carpenter, division inspector and the general inspector who last covered the division, at intervals of about 18 months. This inspection is to a certain extent general in nature.

In addition to these inspections by the bridge department, the track supervisors are also held responsible for keeping the bridges and culverts in repair and the track foremen are required to examine all structures in their territory frequently and to assure themselves of their safety.

#### ON THE CHICAGO, BURLINGTON & QUINCY.

The rules of the Chicago, Burlington & Quincy provide that all bridges be inspected daily by the track forces; monthly by the bridge foremen, or sub-foremen; semi-annually by the master carpenter and annually by the bridge engineer. The daily inspection by the track forces is to discover any unsafe conditions of the structures resulting from storms, derailments, etc., and is very general in character.

A monthly inspection of all timber bridges is made by the bridge foreman or sub-foreman, who reports on a special form all derangements and defects, notifying the master carpenter by wire in case immediate repairs are needed and giving him a list of material required. At least once each year in advance of the annual spring inspection made by the master carpenter, the foreman digs around the pile bents to observe indications of decay and chops away all decayed material to its full depth, leaving the earth excavated so that the master carpenter can ascertain the extent of the decay without labor. In the monthly inspection, particular attention is paid to the caps and each cap which shows any signs of decay or weakness is bored into or otherwise thoroughly explored. At the end of each month a report is made out by the master carpenter and sent to the division superintendent, giving a summary of all bridges inspected during the month with the date on which each was inspected and the general condition of each bridge.

All bridges carrying traffic of this company are inspected at least semi-annually by the master carpenter personally. All other bridges and all culverts maintained by, or at the expense of the company, are inspected at least annually by the same officer. The notes of these inspections are kept in a special bridge inspection book and show the condition of every bridge and culvert in main and side tracks. These notes show the length and height of each bridge; the length, width and height of all overhead bridges and culverts; type of structure; condition, and if repairs are required during the ensuing year they give a concise statement of the condition of the various portions of the structures. The notes of the fall inspection show the material which will be required for repairs and renewals during the ensuing year, measurements being made to determine the length of piles required and soundings being taken where the ground is soft. Where the structure requires renewal or extensive repairs, the notes show where any filling in can be done and give the kind and size of opening required to carry the water. A copy of the notes of the fall inspection as made by the master carpenter is forwarded to the engineer maintenance of way as soon as possible after the inspection is completed.

The spring inspection is made as early as possible and the notes show whether the work outlined is sufficient to maintain the structure in a safe condition until the following spring. A copy of these notes is made by the master carpenter and

also forwarded to the engineer maintenance of way as soon as possible after the completion of the inspection.

A condensed report of the fall inspection is made by the master carpenters and sent to the bridge engineer showing every bridge or culvert upon which it is anticipated that it will be necessary to spend any money during the ensuing year, with the recommendation of the master carpenter thereon. Copies of this are sent by the bridge engineer to the district engineers for information as to the drainage, contracts for cattle passes or undercrosses, etc. Wherever possible, the master carpenters show on this report the cost of carrying over or repairing such bridges and culverts as are reported, with the estimated length of time such repairs will make the structure safe.

The bridge engineer makes an annual fall inspection of all bridges having spans of over 24 ft. and including all culvert and timber bridges reported by the master carpenters to require renewal. The bridge engineer's report of this inspection includes not only his recommendations for current repairs to permanent structures but also recommendations for the renewal in kind or replacement of the culverts and temporary bridges reported by the master carpenter.

In addition to these regular inspections, frequent examinations are made as necessary of bridges and culverts which show signs of serious deterioration. The master carpenters are responsible for the safe condition of all bridges and culverts on their division and their reports of special inspections are made in the same manner as regular inspections.

#### ABSTRACT OF ENGINEERING ARTICLES SINCE OCTOBER 24.

The following articles of special interest to engineers and maintenance of way officers and to which readers of this section may wish to refer, have appeared in the *Railway Age Gazette* since October 24, 1913:

New O.-W. R. & N. Terminal in Spokane.—The O.-W. R. & N. is expending approximately \$7,000,000 in the construction of extensive new freight and passenger terminals at Spokane, the passenger terminals being shared with the C. M. & St. P. These terminals were described in an illustrated article in the issue of October 31, page 817.

New Mississippi River Bridge at Memphis.—The Arkansas & Memphis Railway Bridge and Terminal Co. was organized a year ago by the Rock Island, the Iron Mountain and the Cotton Belt railroads to construct a double track railway and highway bridge across the Mississippi river at Memphis. This structure will be 2,548 ft. long with a channel span 790 ft. in length, and its general features were described in the issue of October 31, page 824.

A Division Office Building Designed for the Hine System of Organization.—The Arizona Eastern is operated under the Hine system of organization. A new division office building is now being built at Phoenix which has been designed to carry out the Hine system of organization. This building was described in the issue of October 31, page 827.

Construction of Clinchfield Extension.—One of the heaviest and most interesting pieces of construction work now under way in this country is that of the Carolina, Clinchfield & Ohio from Dante, Va., to Elkhorn, Ky., to give a northern outlet for the coal originating along this line. This extension is 35 miles long and is costing over \$140,000 per mile. There are 20 tunnels with a combined length amounting to more than 11 per cent. of the total length of the line. This extension was described in a comprehensive illustrated article in the issue of November 7, page 861.

Summit-Hallstead Cut-Off of D. L. & W.—The Delaware, Lackawanna & Western is now constructing a new three track line from Clark's Summit, Pa., seven miles north of Scranton north 40 miles to Hallstead at an expenditure of about \$12,000,000. This line comprises some of the heaviest railway work ever undertaken in this country. The first of a series of two comprehensive illustrated articles describing this work was published in the issue of November 14, page 903.

PROPOSED RAILWAY IN MOROCCO.—Engineers have left Tangier for Casablanca to survey the route of the proposed railway from Tangier to Fez. Afterwards they are to journey to Rabat where they will survey the route of the proposed new line across French territory which will pass through Souk-el-Arba and Le Gharb, and will extend to Lalla-Ito and thence to Meknès and Fez. The work is to be begun in September of next year and is expected to last about two years.



# THE LACKAWANNA FROG AND SWITCH SHOPS.

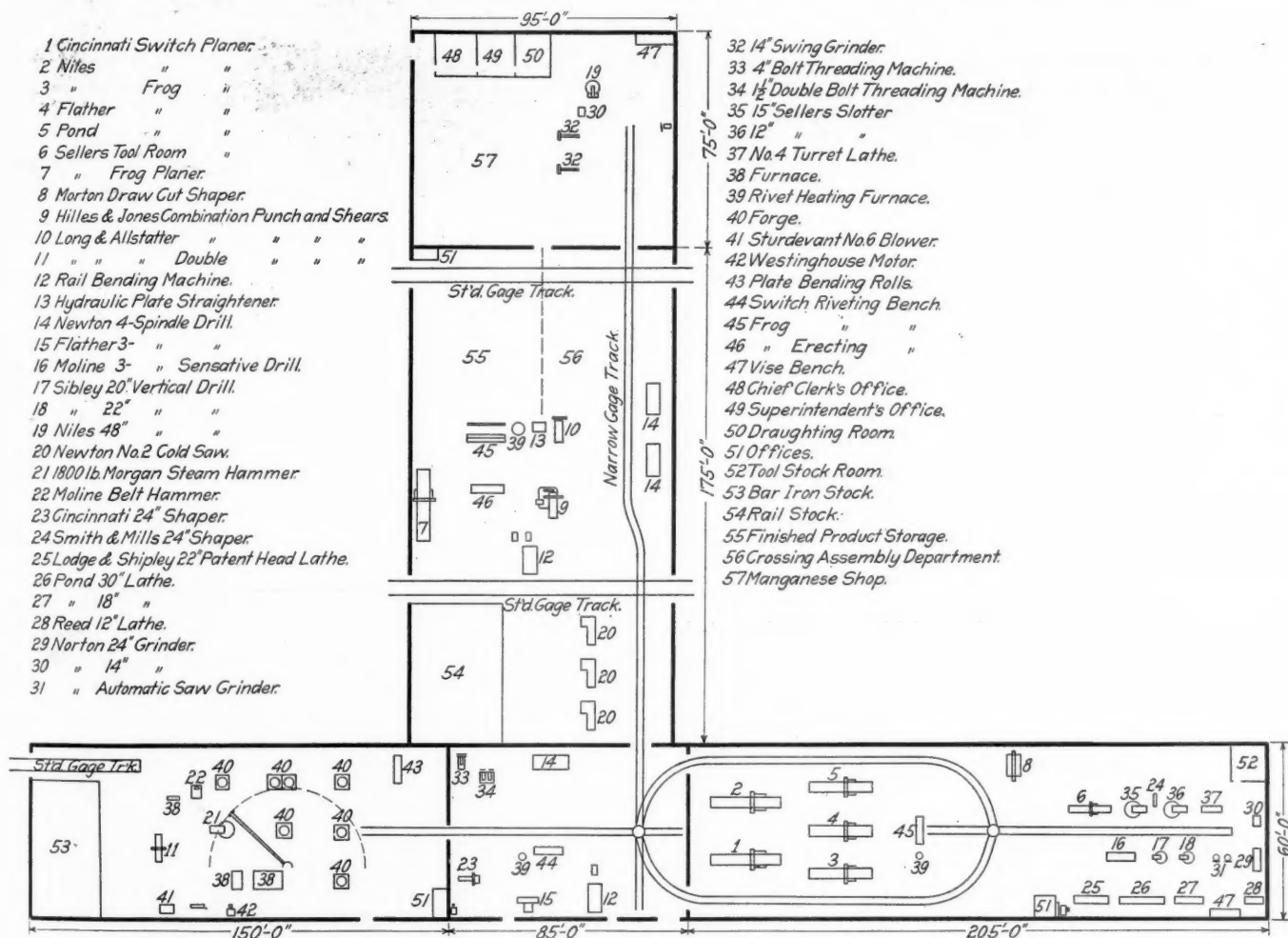
All Frogs, Switches and Special Track Material Made. Track Scrap Handled and 50 per cent of Small Scrap Reclaimed.

The Delaware, Lackawanna & Western has operated a frog and switch shop for the manufacture of frogs, switches and miscellaneous track material, at Kingston, Pa., for a number of years. The facilities at this point, however, have been gradually outgrown and this shop was moved on December 1, 1912, to Dover, N. J., where the company already owned a large brick building built originally as a shop for the car department, but more recently leased to an outside concern after the car shops were moved to Scranton. At this shop all switches, frogs, switch stands and many special track fastenings such as compromise joints, heel blocks, etc., as well as many track tools are made. All track scrap from the system is likewise shipped here, sorted and held for sale by the purchasing department.

while the smaller ones are grouped. Power is secured locally from an outside plant. About 100 men are regularly employed at this shop.

## THE SWITCH DEPARTMENT.

The operation of the shop can best be seen by following the material through the process of manufacture. Taking a set of switch points, for example, the rails are brought into the shop on standard gage cars and unloaded directly by air hoists onto storage racks in the southwest corner of the main building. From the racks the rails are taken to the saws and then to a four-spindle drill press where they are drilled for the joints and reinforcing bars. They then pass to a riveting



Floor Plan and Arrangement of Tools of D. L. & W. Frog and Switch Shop.

The Dover shop consists of two buildings connected to form a T, as shown in the photograph and plan. In brief, the manganese shop occupies the north end of the main building while the south end of this same building is devoted to the rail stock and the frog assembling shop. The frog and switch planers and other heavy machinery are located in the east end of the annex while the blacksmith shop occupies the west end of this building. The scrap yard is located just back of the blacksmith shop. These buildings are situated adjacent to the main line with standard gage tracks leading into them and into the scrap yard. Overhead runways with air hoists are provided throughout the buildings and scrap yard to handle all heavy material. All tools are electrically driven, the larger units being equipped with individual motors

bench in the next room where the reinforcing bars are partially riveted on and are then loaded on a narrow gage car and taken to the two switch planers in an adjacent room. The first planer cuts down the head only, working on two rails at a time. After the head is planed to the proper dimension, these rails are transferred by an air hoist to another adjacent planer which cuts down the flanges. The points are then loaded onto a small car and returned to a bending machine. After being properly bent they are placed on a riveting bench and the riveting of the reinforcing bars is completed. At no point in their manufacture are the switch points more than 60 ft. from the saws and they are loaded for shipment within 50 ft. of the rail pile.

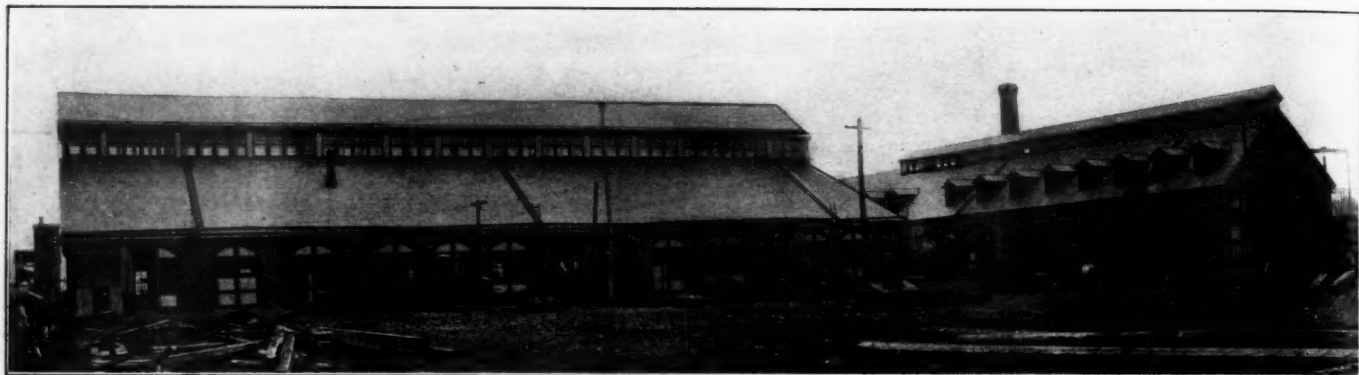
These switches are made of 80 lb., 91 lb. and 101 lb. rails,

the latter two weights being of new open hearth rails, while the 80 lb. switches are made of second hand rails to match up with the second hand rail in the track, no new rail of this weight now being laid. The switches are made in 10 ft., 15 ft., 16 ft. 6 in and 20 ft. lengths, while some 30 ft. switches are now being manufactured. These switches are provided with riser plates punched for screw spikes, with insulated connecting rods for main line work, with malleable skeleton heel blocks, malleable switch braces, forged steel switch lugs, adjustable head rods, etc., and are shipped out from this shop complete and ready for installation. The output of this portion of the plant is 140 complete switches per month. In

the rail is passed to the second planer which cuts down the flange. The side and point rails are then riveted together and taken to the third planer, where the point is cut down. The frog is then brought back to the first room and is sheared, punched, drilled and bolted and riveted together, all riveting being done by air hammers. The manganese frogs are assembled in an adjoining room provided with swinging grinders and other surface grinders.

#### MISCELLANEOUS MATERIAL.

All switch stands for main line and yard tracks as well as those for the mining department are made here. About 125



Exterior of Frog and Switch Shop Before Old Debris Was Cleared Away.

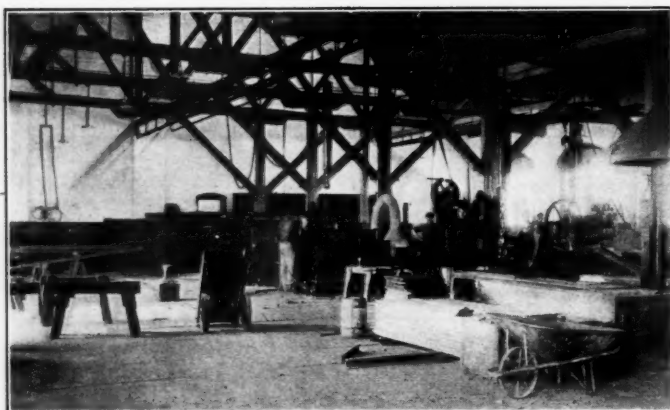
addition an average of 60 switches are made monthly for the coal mining department. These latter switches are made of 40 lb. rail, are from 5 to 7 ft. long and are equipped with two rods and plates.

#### THE FROG DEPARTMENT.

About 170 frogs are turned out monthly for the railroad, in addition to 60 for the mining department. Those for the railroad are made of 91 and 101 lb. new rail and of 80 lb. relaying rail, short pieces of rail saved when cutting rails for track connections being utilized largely for the new frogs. They are of the riveted type of construction. A  $\frac{7}{8}$  in. base plate is regularly used as a means of protection for the ties.

stands are turned out monthly for the railroad and 36 for the mines. A high quarter-throw stand is used for main line work and a low stand for yards, while a jack knife stand is used in mine work. All stands for the railroad are made of malleable iron and are mounted on the head blocks, bolted in place and shipped set up to avoid the use of cut spikes.

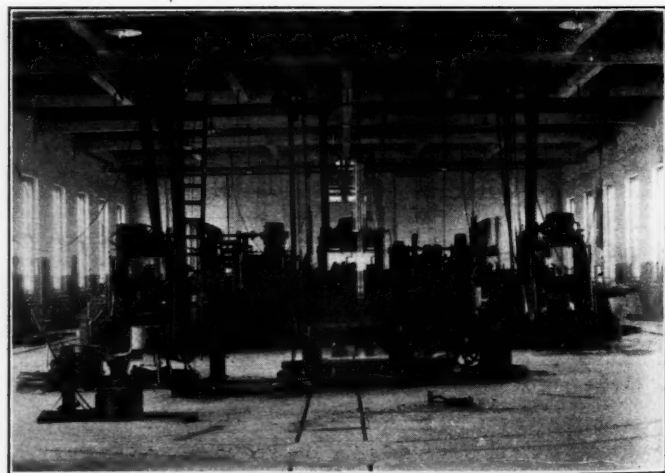
A large amount of miscellaneous track material is also made at this shop. Over 100 guard rails are made monthly for the railway alone. All guard rail filler blocks, plates and rail braces are also made here. About 350 pairs of compromise joints and 220 insulated joints are made monthly as well as



View in Frog Erecting Shop Showing Riveting Benches and Finished Products Storage.

Some manganese insert frogs are also made at this shop, the manganese castings being purchased outside.

In assembling a frog the rails are taken from the rail pile to the saws as described above. From the saws the point and wing rails move to a three-spindle drill press and are then taken to a bending machine where the wing rails are bent. The rails are then loaded on a narrow gage car and taken to a battery of three frog planers. The first planer cuts down the head to the required dimension, after which



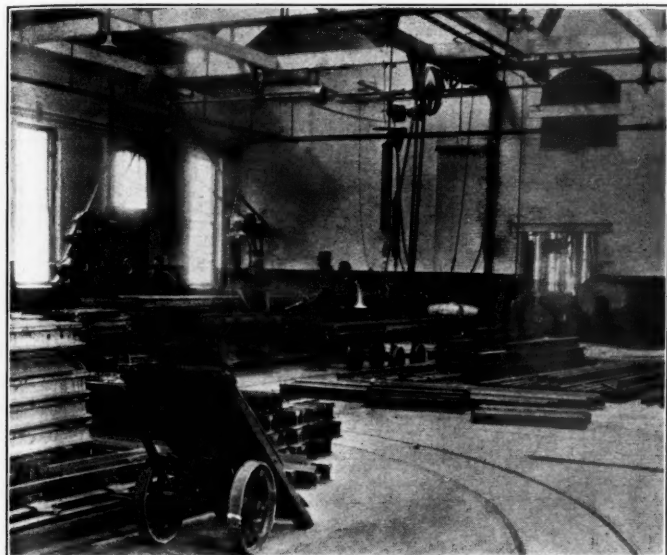
The Three Frog Planers.

an average of six crossings and slip switches. The standard metal fencing required for station grounds, etc., is manufactured at this shop, over 14,000 lineal ft. of this fencing being turned out last year while as much as 50,000 ft. has been made in one year. All cattle guards are made in this shop. All push cars are also made and repaired here. All screw spike tools, track gages, level boards, ballast templets, sighting boards, lining boards, overhead clearance indicators, freight yard cranes, repair parts for rock crushers and screens



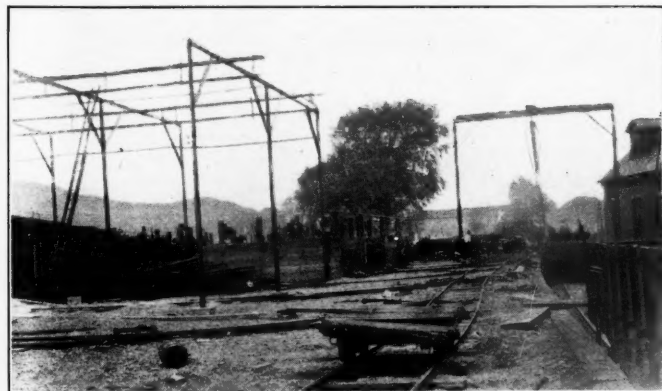
and many other miscellaneous track supplies are turned out at this shop. In making crusher screens for rock crushers, \$20 per set is saved by utilizing cuttings, the cuttings are made into washers for fencing and other work. The output of the Kingston shop for the 12 years previous to the removal to Dover was 22,287 switches, 25,545 frogs, 16,933 guard rails, 10,684 switch stands, 34,414 compromise joints, 28,836 insulated joints and 618 crossings and slip switches.

A recent incident illustrates the advantage of such a shop



View of Switch Assembling Room.

for handling emergency repairs. A steam shovel broke a main shaft recently on Saturday forenoon. The general office was advised and although the frog and switch shop had closed for Saturday afternoon before word could be gotten to it, arrangements were made for certain men to work that afternoon and Sunday repairing the shaft. Accordingly, by the time the shaft reached Dover that afternoon machinists were on hand to begin work upon it. As a result the shovel was able to begin work at 10 o'clock on the following Mon-



Portion of Scrap Yard Showing Frogs Held for Breaking up in Foreground and Scrap Bins in Background.

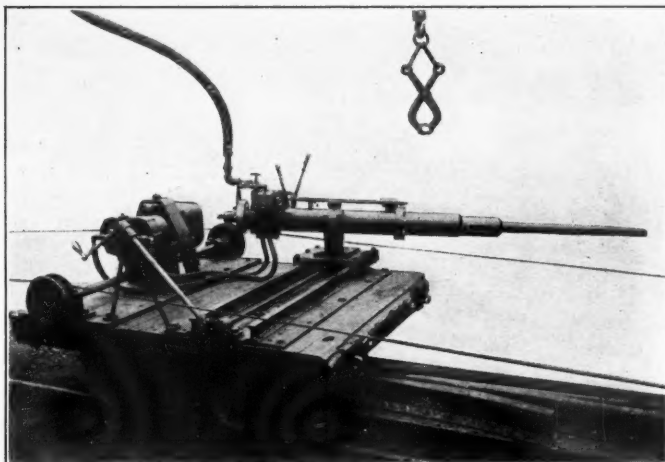
day morning, where, if it had been necessary to handle repairs through the regular mechanical organization, the shovel would have been laid up at least several days.

#### RECLAMATION OF SCRAP.

A very important part of this plant is that devoted to the handling and reclaiming of scrap. All track scrap other than rail is sent here from all parts of the system. Saturday is generally observed as a cleaning up day and the section forces collect all scrap at convenient points for loading. This scrap

is then picked up monthly, the car scrap being loaded separately from the track scrap. The track scrap is sent to Dover and is there unloaded. This scrap is carefully sorted into three varieties and each variety into three grades. The small scrap such as bolts and spikes are thrown into bins, the material being sorted over and the portions fit for further use reclaimed at the time of loading. Angle bars and track joints are neatly piled at another location. All frogs are piled by themselves, as shown in the accompanying photograph, until a sufficient number is gathered together, when they are broken up. All material not reclaimed is held for sale by the purchasing department and is loaded and shipped upon its instructions.

All frogs are cut apart before sale and a large amount of material such as fillers and plates is reclaimed. As one instance of the saving effected the cost of a new base plate is \$3.85. When a frog is worn out and the plate comes into the shop for the first time, it is turned end for end and over and placed under another main line frog. When it comes back the second time it is cut off and placed under a shorter frog for yard service. A number of plates which have come back the third time, have been used as a floor in the Dover shop, as shown in one of the accompanying photographs. It is because of the large amount of material reclaimed from



Machine for Breaking Rivets in Frogs at the Dover Shops of the Lackawanna.

frogs that their cost has been reduced to such an extent that manganese has not been justified to the extent commonly found on other roads.

A new machine has recently been devised by the superintendent of the frog shop to break off the rivets in the frogs. This machine consists essentially of an air hammer mounted on a small car. After the frog is securely mounted in position, this hammer moves from rivet to rivet, breaking them out one at a time. It has broken as many as 6,000 rivets in one day and has reduced the cost of breaking up frogs from \$0.87 to \$0.13.

Bolts and spikes are reclaimed as the material is being loaded for sale, two men picking out the good material as two other men load the scrap. The spikes are straightened while the bolts are rethreaded and provided with new nuts. In October and November, 1912, there were reclaimed from the track scrap, 610 kegs of spikes and 384 kegs of bolts. The scrap value of the bolts was \$0.67 per keg, the nuts cost \$1.10 per keg, the labor of sorting and rethreading the bolts and applying the nuts cost \$0.57 per keg, making a total cost of \$2.34 per keg for material having a reclaimed value of \$4.40, showing a saving of \$2.06 per keg. The scrap value of the spikes was \$1 per keg, and the cost of sorting \$0.20, showing a net saving of \$1.88 per keg. The saving due to this reclaimed material in these two months for spikes was \$1,146

and for bolts \$791, or a total of \$1,937. The above cost figures include interest on the money invested in the plant and 50 per cent. of the labor charge added for supervision.

Similar savings are also being made with switch stands, 60 per cent. of the stands sent out being stands repaired with material reclaimed from scrap. A low stand sent in as scrap is rebuilt in this manner at a cost of about \$1.25. Likewise, the planer chips are sold as scrap, returning sufficient revenue to pay the cost of the tool steel and the planer operators.

About 7,000 tons of roadway scrap is handled annually at Dover at a total cost for handling in and out of \$0.40 per ton. The economies resulting from this attention to the handling of scrap have been illustrated by the instances given above and are further emphasized by the fact that 50 per cent. of all material received here other than rails and angle bars, is reclaimed.

This shop is operated under the general supervision of G. J. Ray, chief engineer, and A. J. Neafie, principal assistant engineer. C. B. French is general foreman in direct charge of the frog and switch shop.

### METHODS OF REDUCING ACCIDENTS.\*

By R. HOLLAND,

Division Roadmaster, St. Louis & San Francisco, Neodesha, Kan.

While the most attention in the "Safety First" movement has been directed towards the elimination of dangerous conditions in the transportation and mechanical departments, I feel this has also been handled vigorously by the roadmasters and superintendents directly with the maintenance men. There are a number of wrong practices which require attention continuously. Many foremen fail to see that their men place the tools properly on the hand car. The track jack is placed on the front of the car when it should be placed on the rear. Tools are often placed so that they will jostle down against the wheels when the car is in motion and it is customary for laborers to replace them while the car is moving, in this way giving rise to a great many injuries. I recall one instance recently when a track chisel was placed on a hand car where one of the men working on the back lever would stand. The laborer stepped on the chisel, turning the handle upward and catching his hand between the handle of the track chisel and the hand car lever, breaking a finger. Had the chisel been properly placed on the hand car, this accident would not have happened.

It is a common occurrence for trackmen to take chances in rounding curves where the view is obstructed. To cover this, I have issued instructions to all section foremen on my division that the hand car be stopped at all points where the view is obstructed and a flagman sent ahead to insure absolute safety. Men are very often injured in taking the hand car off the track in an unfavorable place. I have built from two to four hand car harbors per mile to avoid this.

Some foremen work their entire gang of four to six men in a bunch. This is not only dangerous but is not the proper way to get results, for by working them close together the men are often injured by tools. In renewing ties, they should be divided into pairs and the pairs should not be worked closer than 15 to 30 feet apart. In this way we are getting good results and have not had an injury from this cause.

Where we have a small force, I never allow men to handle rail by heaving it, but require them to use skids and furnish them with two pieces of rope with hooks on one end with which to hold the rail. The skids are oiled slightly, and the rail pulled up in this way. The men can load more rail and do it quicker and easier than by heaving the rail onto the car in addition to eliminating the personal injuries.

There are probably more trackmen injured in cutting rail than in any other work they have to do. I do not believe this is caused by defective tools such as battered sledge faces or chisel

heads as much as by the manner in which the work is done. In many cases where a man is struck in the face or eye by what is supposed to be a fragment from the chisel head or sledge face I have found that it is a fragment from the rail caused by the chisel not being placed on the same cut on the rail. In this case the chisel was struck before the man holding it could place it in the original cut, and as a result an additional fragment was cut from the rail. It is natural for the laborer who is handling the sledge to strike it too quickly and too hard.

Many trackmen are injured when distributing ties from cars. It is the general practice for the foremen to get on the ground, leaving the laborers in the car to do the unloading. Many of the men are not experienced in handling ties and are injured. I have issued instructions that when unloading ties, there must be one or two foremen in the car with the men to instruct them how to handle and unload the ties without injuring the men engaged in the work.

I believe that 95 per cent. of the personal injuries to maintenance men are caused by the foreman not properly handling the work. A great many foremen do not like foreign labor and for this reason never show the men how to do work properly. I can recall one instance where a foreman was ditching a cut on a heavy grade, the material from the cut being moved to a fill 300 ft. east of the cut by push cars. In order to brake the cars a 2 by 4 piece of scantling was placed under the frame of the car and on top of the wheels. The foreman allowed a laborer to use this brake device on the front wheel of the car, resulting in throwing him from the car and injuring him badly. Had the foreman used the device on the back wheel, the accident would not have happened.

The roadmaster should be in close touch with his foremen and have constant supervision over them, instructing them fully regarding safe methods of doing work. My observation is that when you have educated the foremen regarding the proper manner of handling their men, you have accomplished a great deal.

### COMMITTEES OF THE ROADMASTERS' ASSOCIATION.

The following subjects have been selected for investigation by the Roadmasters' & Maintenance of Way Association for the coming year:

New and Improved Manual and Power Driven Track Tools, J. W. Dahl, N. Y. C. & H. R., chairman; Coleman King, L. I.; H. E. Astley, N. Y. N. H. & H.; P. H. Madden, C. M. & St. P.; D. O'Hern, E. J. & E.; C. J. Coon, N. Y. C. & H. R.; G. H. Brooks, St. L. T.; J. J. Duffy, C. & I. W., and D. Foley, M. C.

Proper Organization and Economical Use of Labor and Material for the Safe Maintenance of Track, P. J. McAndrews, C. & N. W., chairman; William Shea, C. M. & St. P.; Emmett Keough, C. B. & Q.; J. O'Connor, M. St. P. & S. S. M.; W. E. Haberlaw, C. R. I. & P.; M. Griffin, C. R. R. of N. J.; T. Hickey, M. C.; W. E. Davin, P. & L. E., and A. E. Hansen, A. T. & S. F.

Proper Method of Rail Renewal, A. M. Clough, N. Y. C. & H. R., chairman; W. J. Edwards, A. G. S.; C. H. Gruver, C. R. I. & P.; J. H. Reagan, G. T.; John Shea, D. & I. R.; J. E. McNeil, A. T. & S. F.; T. Hughes, N. & W., and M. J. Connerton, C. N. O. & T. P.

Proper Type of Track Accessories, M. Donahoe, C. & A., chairman; G. Beckingham, G. T.; J. A. Roland, C. & N. W.; I. C. Ellison, St. L. I. M. & S.; J. B. Mabile, C. R. I. & P.; J. H. Cummings, B. R. & P.; A. M. Anderson, C. M. & St. P., and T. Mahoney, B. & O.

Cleaning and Policing the Right of Way from the Standpoint of Safety and Economy, J. P. Corcoran, C. & A., chairman; Edward Leao, C. G. W.; M. Murphy; Joshua Buel, A. C.; S. L. Purdy, A. T. & S. F.; A. A. Wells, Southern, and H. T. Reinicker, N. & W.

\*Received in the contest on "Safety" which closed October 25, 1912.



# SUGGESTED MEANS FOR HOLDING LABORERS.\*

Continuation of Discussion of Practical Methods for Retaining  
Employees in the Track Department; Care of Men Essential.

## HOLDING LABORERS UNDER ADVERSE CONDITIONS.

By W. K. WALKER,

Division Engineer, Missouri Pacific, Wichita, Kan.

Working in a section of the middle west, where 70 per cent. of the laboring class are following agriculture for a living, the maintenance officials of railroads are continually on the lookout for some method to put into practice, which will induce competent laborers to enter and stay with track and structure maintenance work. It is a comparatively easy matter to organize extra gangs for construction work at almost any period of the year. However, this question assumes an entirely different light on regular section or structure gangs, which employ on an average the same number of laborers each summer, with only a slight reduction during the winter. The question of holding the same men for several months at a time in the face of offers of advanced wages by contractors doing municipal or other than railroad work, or by farmers or ranchmen during a few months in the year when agricultural work is at its height, or of offers of better wages and less work, (easy foremen) on other roads, is a difficult one to settle satisfactorily.

I have been fighting this labor question in this same territory for the past eight years, and only in the last two years have I been able to make very much advancement. Recently I have been able to realize to a limited extent the fruits of my efforts to provide conditions that would hold men on my sections the year round. I have seen the time when the sections would not average one half man each during harvest. However, in the past two years there has never been a time when I had less than two men to a section. Among the means adopted to secure this improvement are the following:

On 175 miles of this division—which is that portion of the territory on which I had the most trouble in holding men—gasoline motor cars have been installed, replacing ordinary hand cars. Many times men working on section and structure gangs have said that they liked their work, except the hand car portion of it. With the hand car eliminated and the men going to and coming from work on a motor car, they are remaining on the section months at a time, whereas before they never were known to work any longer than to make a small "stake." Also with motor cars the men do not lay off one to three days out of each week, as they did when we used hand cars. I consider the motor car of very great service in the holding of laborers on sections.

Another inducement I offer men who stay with me, is promotion to the position of foreman as fast as they are competent, and when there are openings, I make it a rule never to hire outsiders as foremen. The men all understand that they are not going to be run around by some floater and they work to merit the promotion when it may come. During the summer months the regular section foremen are used on the extra gangs, in order to give them the extra pay. During the time the regular foremen are on extra gangs, men are advanced from laborers to acting section foremen. This not only gives them an incentive to work on the section, but helps to provide foremen as they are needed. It is a very easy matter now to put on several new foremen on very short notice.

Even with the use of motor cars and the offers of advancement in position there are sections of the country where we are unable to obtain resident laborers. At these points we import foreign labor. The class of foreign labor used is Mexican. No other class of foreign labor is employed here to any extent. In order to hold the Mexican, one is compelled to provide living quarters.

Any old shack will not suffice. A Mexican likes comfortable quarters, and the road that provides the best quarters is the road that has the least trouble in holding these men. If one is lucky enough to get hold of a Mexican family, and will furnish comfortable quarters, nine times out of ten he will have a laborer who will stick to the job.

Good quarters can be provided for Mexican laborers at a very small expense. I have taken care of this by utilizing a number of old bunk cars, which were unfit for road service. These were dismantled, the old car body was set up on blocking, the doors and windows were repaired and the inside sealed. A partition was put in near the center, which divided the car into two parts with one end for sleeping quarters, and the other for cooking, eating and other purposes. A heating stove is provided for the sleeping end of the car. I have never made it a practice to furnish these men with fuel during the winter months, but it is my opinion that this would be a great help in holding men.

One other model and economic way of providing living quarters for Mexicans is to build houses of old ties placed on end, cracks being filled with stiff clay. The roof is sometimes made by using timbers for rafters and putting on a straw and sod roof. The house is then whitewashed inside and out, the use of cold water paint being better for a white wash than lime. These houses can be built of any size desired. They are on the style of the adobe house used in Mexico, and the Mexicans prefer them to the bunk car or bunk house. I am informed by Mexicans who have lived in these houses that they are very warm in the winter.

Until a laborer can get sufficient funds ahead to pay as he goes, the company allows the foremen to arrange with some resident merchant to furnish the men with supplies, and he makes board deductions from the laborer's earnings. Deductions are not allowed to be made for the full amount of the check earned, as pay day is something to be looked forward to and it makes the men feel better satisfied to know that when it comes each month they have real money coming to them. For this reason we only allow 70 per cent of a man's wage to be deducted for board, etc.

The treatment of laborers by the foreman has a great deal to do with his success in holding men. Every foreman should get a full day's work out of every man on his gang every day, but I do not believe in working men to the limit of their capacity. A foreman must make a study of every man on his gang—and each man must be assigned to the work he is best fitted for. He should be firm with his men and see that they do their work well. At the same time he should be kind and always willing to help the men out when he sees that they need his help. The foreman who treats his men with kindness, combined with firmness and sees that his orders are properly obeyed, is the foreman who has the least trouble in holding men on his section.

The problem of holding laborers varies widely in different sections of the country. Each class of foreigners requires different treatment and accommodations. One must study the class of men he is working, become familiar with their peculiarities and try to meet them. A laborer who is pleased with his surroundings and likes his foreman is not going to quit just to be roaming around the country.

I do not think there is any one reasonable thing that can be done by all maintenance officials alike that will hold laborers, but each one must work out his own problem. He cannot apply the same rule to his entire division but must make a study of each section and try to meet the requirements of the section. While the foregoing methods have helped me a great deal, no one of them will apply by itself. It is the combination of them that has

\*Four papers on this subject were published in the issue of October 24, 1913, page 771.

enabled me to hold some men at all periods for the past two years.

#### **PRACTICAL SUGGESTIONS FOR HOLDING FOREIGN LABORERS.**

By A. M. CLOUGH,

Supervisor, New York Central & Hudson River, Batavia, N. Y.

There is no question but that the longer one can keep laborers in the same occupation the more proficient they become, providing, of course, that they are under the proper supervision and are properly instructed. This can only be accomplished by the foreman or those immediately over the men keeping at a respectful distance from them socially and ruling them in a firm yet appreciative manner. In no place more than in the maintenance of way department are foremen and laborers brought more closely together, traveling to work in the same coach or work train caboose or on hand cars, and sometimes eating their noon-day meal under the same shade trees. Bad results have frequently been noted where a foreman mingles with his laborers, playing cards or otherwise being unduly familiar with them while off duty, after which they will try to take the same liberties with him while at work. The roadmaster or foreman who would command the respect of his men will find the least cause to discharge them and also insure his men staying with him or returning to him year after year, in case of summer forces, by rigidly observing the following rules: If a native foreman, he should select an intelligent assistant foreman or interpreter of the nationality of the majority of his men. If a foreign foreman, he, of course, should be chosen because of his intelligence and ability to handle men and he should have nothing to do with providing food for the men or in any way handling their finances. An accurate timekeeper should be provided where gangs are large. Section foremen, of course, keep their own time, and very particular attention should be given to see that their time is accurately kept, that the men be given all the time they work, and if overtime, they should be told just how much they have made. They should also be told before each payday how much money is coming to them so that there will be no misunderstanding or wrangling about short pay when the pay car comes along.

In working men, the best results can be had by mapping out a day's work and giving them an object to work for, especially in laying rail or handling gravel or stone ballast, when they can see the end of their day's work and the foreman can enthuse them with this end in view. The day will go by pleasantly for them and they will try to accomplish the work outlined with both vim and vigor.

I have also found it very conducive to good results to let the men have a few minutes' rest in the middle of the forenoon and afternoon, perhaps by cutting the noon hour in half and taking the time thus saved for those periods. They should be provided with good living quarters, either in well ventilated and properly heated box cars or in boarding houses, and they should always be required to keep these quarters in a clean and sanitary condition. Plenty of good water should be within easy reach of the camp and a plentiful supply should be carried to them while at work. They should be required to eat good wholesome food of their own liking, which can best be furnished by a labor or commissary agent who, while not necessarily furnishing all the labor, should furnish most of the food the men eat. Their food is different in many ways from that which can be bought at a village or city store, and an agent who is under bonds to the company to properly care for and correctly charge the men for the goods furnished them will prove more satisfactory. The company deducts a certain amount from the laborer's pay for this agent and in this way the men are not subject to exorbitant charges and are not imposed upon by the so-called padrones who are permitted to charge without restriction.

To provide the men with good tools kept in first-class shape should be the constant aim of employers, and care should be used to keep men from getting killed or injured, as nothing tends to demoralize a gang of men more than one of their number being injured while at work. Also the habit, which fortunately is not so common as it used to be, of men in other departments calling the foreigners names and otherwise belittling them should be most strenuously discouraged.

While it may be said that with many men these measures need not be brought to bear, it is safe to say that from the standpoint of humanity, the gratification of having a contented lot of men as well as the result accomplished and the returns given to the employer will well repay a trial.

#### **ATTRACTING AND HOLDING LABORERS IN RAILROAD SERVICE.**

By JOHN S. THOMPSON,

Assistant Supervisor, Philadelphia & Reading, Philadelphia, Pa.

The subject of means for attracting and holding laborers in railroad service is one that always gives considerable trouble and difficulty. The hardest feature of the subject is "attracting." Local conditions affect this considerably and play a large part in finally getting the laborers. For example, take a territory that is wholly within or adjacent to some large city of 1,000,000 inhabitants or upwards where there are always several large competing railroads and many manufacturing concerns and contractors. While the railroads usually pay the same wages, the manufacturers and contractors nearly always pay from two to five cents more per hour, and an employer of labor has to depend upon his men old in service to bring the "green" ones to him for employment. Then, it is up to him to hold them.

The ability to hold men depends very largely upon the "personal equation" of the foreman. If he will only take the trouble to become acquainted with his men, endeavor to help them in every way possible and be pleasant to them, showing them in this manner that the "boss" has a personal interest in them, it becomes an easy matter to show a laborer that 18 cents per hour with the railroad is better than 25 cents with the contractor, for a contractor does not pay his men for "rainy" hours. The foreman should urge the men to get as much education as possible, showing them the advantages of an education, and recommend some night school or teacher to them so that they could get required education to fit them for sub-foremen or foremen. He can also point out to them that there are other positions on the railroad outside of their own department for which they could qualify. The promotion of a laborer travels very quickly among the men and is a big benefit to the employer, not only in holding the men but also in attracting others to the service.

A policy in accordance with the above that will give good results is to give definite instructions as to the work to be done, then see that they are carried out. Have a cheery greeting or a pleasant word, not only for the foremen, but also for the men. When a reprimand is necessary, give it emphatically; forget it, and resume the friendly relations. Give them a friendly wave of the hand from the rear end of passing trains; the men are being noticed by the "boss" and like it.

By adopting such a method it will be found that the men work harder and better results are shown; they work with you and not against you; they are pleasant, and a pleasant, happy man always accomplishes more than a "grouch," and they stick.

A good scheme to attract and hold laborers is the "sliding scale" method in which the laborer entering the service is given the lowest rate of pay per hour and then increased at the rate of one cent per hour at the end of each year for a period of five years. From the laborer's point of view, this will appeal to him, for he is sure of earning more each year.



From the railroad's standpoint, he will stick and each year he sticks, he becomes more valuable. The scheme scales something like this: First year, \$0.18 per hour (or lowest wages paid); second year, \$0.19 per hour; third year, \$0.20 per hour; fourth year, \$0.21 per hour; fifth year, \$0.22 per hour; sub-foreman, \$0.25 per hour; foreman, salary.

One road starts the "green" laborers at the lowest rate of pay and gives them an increase based on their increased efficiency. This is also a good method, but it has the disadvantage of causing jealousy among the men.

#### PERMANENT EFFICIENCY.

By J. J. MORGAN,

New York Central & Hudson River, Kingston, N. Y.

The permanency of efficient labor has a marked effect on the results obtained, not alone in track labor, but in practically every line of railway work. The experienced, efficient laborer is, in reality, one of the railroad's most profitable assets, and his services should be retained permanently. Extra gang laborers are, naturally, a mixed class, but in their ranks can often be found painstaking, efficient men possessing all the requisites of the model trackman, and men whose employment should be of a more lasting nature. The placing of such laborers in permanent section gangs whenever the opportunity presents itself goes a great ways toward establishing a permanent working force. Oftentimes these "finds" are accustomed to boarding in the cars, laborers' houses, etc., provided by the railroads, and in order to insure the permanency of their employment when transferred to a permanent location, it is not a very difficult matter to induce them to move their families to the new location, thereby practically eliminating any possibility of their desiring a change.

The furnishing of sanitary accommodations has a powerful influence, as it attracts the "knowing" class of labor, while the more common and undesirable class are, as a rule, not very particular in regard to the accommodations meted out to them. Where first class accommodations are provided, it is not necessary to beg the men to return to that locality the next season, the conditions themselves being sufficiently inviting.

The question of supervision plays a conspicuous "role" in this drama of permanency. Right treatment is one of the main points governing the location where the track laborer seeks employment. A pleasing atmosphere in which to work aids wonderfully in the accomplishment of permanent efficiency. The advancement of a laborer whenever possible to the position of foreman or assistant foreman has a tendency to incite new hope and ambition in the trackman, and coaches him on to efficiency and perseverance in his work with the inward intention of one day being granted a promotion on the real merit of his endeavors. We can easily distinguish the efficient from the inefficient, and in view of this fact the foremen should use tact in placing the experienced men at work which requires experience and efficiency. While increasing their efficiency and stimulating their confidence to shoulder work which demands responsibility, this also does away with any cause for their dissatisfaction on account of being placed at undesirable work which could as well be taken care of by the "green" laborers.

Where different rates are allowed, the efficient men should certainly receive the larger benefit, and the higher rates should be based solely on efficiency and length of service. When the forces are gradually reduced at the close of the season, discretion should be used in holding the efficient men as long as the authority holds out. The question at hand is one of far-reaching consequence, the solving of which necessitates bringing into play many small and seemingly unimportant points, of which those mentioned above are but a small percentage. Nevertheless, in this connection "the little things surely count."

AUSTRALIAN NORTHERN TERRITORY RAILWAYS.—Surveyors in the employment of the Australian government have now completed the survey of 337 miles of railway in the northern territory. The proposed line will go in a southerly direction from Pine Creek to the Katherine river.

#### DON'TS FOR BRIDGE FOREMEN.

Fifty don'ts for bridge foremen are given in a recent issue of the *Rock Island Employee's Magazine*. A few of the more important ones which are applicable to all roads and which are sometimes overlooked, are as follows:

Don't handle heavy girders with jacks when it can be done at half the cost with steam derricks.

Don't start a piece of work until you have all the material on the ground.

Don't use new material where second-hand will answer the purpose if it can be obtained.

Don't break track without force enough to handle the work.

Don't size caps on pile trestle bridges.

Don't handle and roll timber around unnecessarily.

Don't put in frail or light cribbing around washouts.

Don't attempt a piece of work until you understand the plan and have decided on a method of handling the work. Then carry it to completion along those lines.

Don't figure that you will need no protection for a small piece of work on straight track, even with no trains due for a time ample to complete the work; it is the unexpected that causes accidents.

Don't neglect cleaning up around bridges and structures after the work has been completed. Pile up or ship all usable material to the next job and burn all scrap; it is a part of good house-keeping.

#### RAISING THE RELOCATED PANAMA RAILROAD.

The sliding on the fills across the bottoms of the Brazos and Quebrancha rivers on the relocated line of the Panama Railroad was so serious during the course of the work that in raising the fills to a height of 60 to 70 ft. an average of about 1,660,000 cu. yds. of material per mile was required. Up to the time of opening this line in February, 1912, the embankment had been raised only to an elevation 3 ft. below grade. Since the line has been in service the settling of the fill has lowered the track from 1 to 2 ft., so that it has been necessary to raise these fills about 5 ft. The bottoms appear to be holding satisfactorily and the rise of the water in the lake alongside has not seriously affected the material. The completed fills are being made 40 ft. wide at the top and the slope is usually about one to four. A little over 100,000 cu. yds. of material, which will be required for raising these fills, is being supplied by steam shovel excavation from a borrow pit located at a convenient point.

#### REPAIRING WOODEN TANKS WITH CONCRETE.

Where the bottom of a tank is decayed to such an extent as to make it impossible to draw the staves sufficiently tight to prevent leaks, it has been repaired in a number of instances on the Baltimore & Ohio by placing a mixture of 1:3:5 concrete on the inside floor of the tank. This concrete is placed from 4 in. to 6 in. thick, depending on the condition of the staves or the chime at the bottom of the tank. New hoops are then placed on the bottom of the tank and are drawn up tight. In every case where this method has been used the leaks have been overcome, and it has been possible to maintain tanks for several years that would have been rebuilt at once under former methods. When making such repairs, the condition of the joists on which the bottom of the tank rests is inspected at the same time, and if in bad shape, they are renewed. Several tanks are still in service on which this method of repairing has been used for 8 to 10 years. We are indebted to George W. Andrews, inspector of maintenance for the above information.

# MAINTENANCE OF WAY MASTER PAINTERS' ASS'N.

Abstract of Papers Presented at Tenth Annual Convention  
Held on Tuesday-Thursday of This Week at Louisville, Ky.

The tenth annual convention of the Maintenance of Way Master Painters' Association was held on Tuesday, Wednesday, and Thursday of this week at the Hotel Henry Watterson, Louisville, Ky. This convention compared favorably in attendance and interest with previous meetings. The officers for the past year were: President, George Heintz, P. & L. E., Carrick, Pa.; First Vice-President, C. H. Plummer, C. R. I. & P., Topeka, Kan.; Second Vice-President, Charles Ettinger, I. C., Chicago, Ill.; Secretary-Treasurer, William G. Wilson, Middletown, N. Y.

The principal papers presented at this meeting are given in abstract below.

## DIFFICULTIES AND DEFICIENCIES IN RAILWAY BRIDGE PAINTING.

By WM. G. WILSON

Paint and paint materials never were better made than they are to-day. However, while this is true, conditions are changing, and every year adds some new condition or difficulty for the painter. The object of this paper is to discuss some of these conditions, such as brine drippings from refrigerator cars, drippings from soft coal cars, coal ashes, cinders, dirt, smoke, sulphurous gases, etc. These conditions have come to stay. We cannot remove them, so we must meet them as best we can. The railway foreman painter is the man on the job. By careful observation he can analyze the conditions and by common-sense methods overcome them to a certain extent. Different surfaces, different climates, different exposure and different conditions of application require different paints and compositions. The question is not what a paint is made of but what it will do. The greatest mistake in railway bridge painting is to use any one particular kind of paint to meet all conditions on all parts of a structure alike, or on all bridges regardless of locations or conditions.

When applied to all parts of a bridge alike, good linseed oil and pigment will give splendid protection to such parts as have sunlight and open-air exposure, but will utterly fade on such parts as have dampness, salt brine, smoke, and acid exposure. A bridge built at a high elevation in dry, open air and sunlight, and of open truss construction, can be easily protected with any good linseed oil paint. All parts of a bridge of riveted plate girders built low over water, swamp or marshy ground and carrying heavy freight traffic on main lines cannot be protected with a pure linseed oil paint. This kind of a structure requires special attention with a special moisture-proof paint. If this bridge is painted with linseed oil paint, the upright parts may be in good condition two, three, or four years after painting; while, under severe conditions, the horizontal parts, tops of cords, floor beams, struts and gusset plates will rust within a few months. Then some one condemns the paint and tries another of the same nature, but probably made by another firm, only to meet the same results, whereas the fault is not with the paint at all, but with the engineer or painter.

The cause of paint failing to protect certain parts of a structure is a difference in exposure. Moisture and oxygen destroy the iron or steel, and they should be kept away. This may be difficult, but it can be done. Paint to protect and not merely to coat over as many contractors do. The railroad painter should look for quality. The contractor makes his profit from quantity. Painting may be the preservation of a structure or its destruction. Every square foot of surface a contractor can avoid cleaning and removing rust from is money in his pocket. It does not matter much to him if the surface is wet or dry. If the inspector is not looking, his men will paint it over. In many instances the inspector is a railroad carpenter, not a painter, and any place that is covered with paint is painted so far as he is concerned. He can understand the quantity of paint put on, but does not understand properly rubbing and working it out.

Another deficiency originates with the practice of allowing carpenters to paint the tops of bridges when laying new bridge ties. The painter will have a standing order to supply the paint to the division general foreman of carpenters, who has orders to paint the tops of all bridges when laying ties. This work is done at all seasons of the year and in all kinds of weather. The carpenters have no proper tools for cleaning the rust from the iron. If the rust is very thick, some of the coarser scales may be scraped off. Snow and ice may be partially removed or there often is a drizzling rain falling. As arrangements have been made to run trains over the other track, the ties must be laid and the top of the bridge must have a heavy slushing of paint, regardless of conditions.

The paint cannot dry or fasten to the iron under such treatment, and serves only to catch dirt, sand, ashes, and cinders. Then when brine from refrigerator cars is sprinkled into it, this makes a salt pad to hold moisture and promote rust. The intent of the order is good, but the outcome could not be worse. The remedy: Leave the application of paint to the painter and allow no paint to be applied to iron or steel except under the most favorable conditions.

We paint to preserve, but we must be very careful or we may paint to destroy, and defeat the very purpose of painting. The electro-chemical reactions in corrosion may be divided into two stages: First, the solution of a small portion of iron, and, second, the oxidation of this iron to ferric hydroxide, or iron rust. The red oxide thus formed is insoluble, and when precipitated leaves the way clear for more iron to enter solution and for the further combination of iron with oxygen. These conditions will continue so long as there is any oxygen, water or iron left. The absence of either water or free oxygen makes corrosion impossible. The rate of corrosion depends among other things on the amount of each of the elements present. The rate of solution and corrosion depends principally on temperature and the character of the water, the galvanic action between the different materials, electrolysis from stray currents, and many other minor influences. Corrosion would be simple if we had only oxygen, water, galvanic action, etc., alone to deal with, for then any good linseed oil and pigment would preserve the structure. Linseed oil is the most admirable vehicle for all paints to be used on wood, on account of being porous to some extent, but it is very susceptible to the destructive influences of these destroyers of paint.

After carefully investigating so far as limited means would allow, I believe that a prepared paint vehicle made of linseed oil reinforced with China wood oil, is a great improvement in waterproofing the paint. I have tried several kinds of paints said to contain China wood oil, and some paint oils said to contain China wood oil, and have found that they will dry quicker with a hardness and non-porosity that will outwear linseed oil under hard exposure. Tests made on bridges by painting parts exposed to the same salt brine or exposure to smoke, engine exhaust and gases, showed that where linseed oil paint lasted well for three to four months linseed and China wood oil paints lasted one year and were in good condition. On a bridge where the floor system was painted with two coats of red lead and two coats of black carbon, salt brine exposure had destroyed the linseed oil paint in 6 months. The same exposure on China wood oil paint stood two years in fairly good condition, and parts of the same floor system painted with a patent moisture-proof paint stood two years in good condition. A mixture of red lead, asphaltum varnish, and extra car varnish, mixed one gallon heavy red lead in linseed oil, to which was added one pint heavy No. 96 liquid gum binder, three-fourths gallon asphaltum varnish, and one-fourth gallon extra car varnish, was applied to the tops of tie plates, floor beams, struts, and brace plates. After



thorough cleaning, this dried in splendid condition, and permitted the application of two heavy coats in one day, under exposure that would destroy straight linseed oil paint before it could dry at all. On parts of this same bridge not subjected to direct moisture and brine exposure black carbon paint lasted well for three to four years.

With a special reinforced linseed oil paint, absorption of moisture can be overcome to such an extent as to allow all parts of the bridge to be protected alike by proper cleaning and touching up each year. On main line tracks under severe exposure all bridges should and must be carefully cleaned and touched up with a heavy moisture-proof reinforced oil paint by a competent man at least once a year. This light expense will save one-half to three-fourths of the present cost of railway bridge painting. When a bridge is in good condition, keep it so. It is the only way to paint to preserve the structure. Ordinarily 75 per cent. of the cost of bridge painting is for cleaning, and in this way 60 per cent. of the cleaning can be eliminated. That means cutting the regular cost of bridge painting in half.

It is commonly agreed that red lead and linseed oil make the best priming coat and filler for bridge painting; but there are exceptions to all rules. I know of large bridges subjected to excessive salt brine drippings, coal dirt, cinders, soft coal, and ashes into which hot and cold water from shifting engines is constantly being dripped. To make a bad matter worse, engines on tracks passing under the bridge subject it to the action of sulphurated hydrogen and sulphuric acid. These agencies quickly destroy red lead and oil which are about the worst materials that can be used in parts of structures subjected to these conditions as in train sheds. The rusting of surfaces subjected to these conditions is greatly accelerated by galvanic action which causes the pitting.

There are cheap, non-drying black Japan elastic roof paints that will protect under these conditions and by carefully cleaning and painting once or twice a year preserve the structure. If a cheap non-drying black Japan roof paint will give better results in these situations, why cannot a paint made of better materials and with the ultimate object of protecting iron under severe conditions, help solve the difficulty? There are several specialties made for this very purpose by eminent chemists and paint makers. Special paints for special purposes will greatly aid in the preservation of structures under severe conditions.

#### THE ADVERTISING VALUE OF RAILROAD PAINTING, DECORATING AND NEATNESS OF APPEARANCE.

By MARTIN KANE,

Master Painter, Delaware & Hudson, Albany, N. Y.

The advertising value of decoration and neatness of railroad properties is founded on the very meaning of the word—it directs attention, it attracts, it causes comment. The most effective appeal to human nature is through the senses; that impression which appeals to the æsthetic taste remains with us, and no stronger appeal can be made than through the sense of sight. Well-kept, neat, and properly decorated railroad properties, resulting from efficient and effective painting, must appeal to the sense of sight, and consequently attract, direct attention, and cause comment. In so doing, it obtains all of the results expected of advertising, and, furthermore, it is, and becomes, a permanent standard and a fundamental form of advertising.

The old adage, "Actions speak louder than words," is especially applicable here, for above and beyond any written or printed decoration of the efficiency of a railroad, the properly kept properties of a road are the absolute realization in one of the road's most important features of its efficiency. The immediate results of proper decorating and neatness of appearance in railroad painting will be found in its benefit to the passenger, to the community in which the railroad properties are placed, and finally to the railroad itself.

The passenger benefits, for there can be no question that neat and wholesome surroundings, when entering upon or completing a journey, do much to relieve the monotony of it, and that neat

and decorative painting of properties along the route of his journey are to the eye surfeited with the sameness of the scene, an immense relief.

The community in which well-kept, neat, and properly decorated railroad properties are located is benefited because of the great effect exercised upon the community itself. Every community has its local pride, and this pride will induce private individuals to endeavor to live up to the general excellent condition in which the road properties are kept.

From the benefits and advantages secured by the passenger and the community, and the consequent advertising, the railroad is aided. The passenger, from the efficient condition of the railway properties, receives his impression of the general efficiency of the road and proves it to his friends, neighbors, and associates. This result is an increase of passenger traffic.

The community benefits by the railway properties because of an attitude of general friendliness toward the road, and will patronize the road in preference to a competing road, from which no such benefit has been derived. This will result in an increase of both freight and passenger traffic. Favorable impressions are gained by industries and manufacturers seeking locations, and may result in their locating along the railway, which will mean increased business for the road.

Nearly all railroads have their standard colors, but the most pleasing colors are harmonious combinations properly applied under the direction of competent master painters. The most valuable advantage of advertising that railroads possess is the painting of signs on freight and passenger depots. This branch of advertising is neglected on many roads, and is a direct loss to the railroad, community, and passengers.

#### CAN CONTRACTING OF RAILROAD PAINTING BE DONE WITH ECONOMY TO THE RAILROADS?

By J. C. WILLIAMS,

Master Painter, Northern Pacific, Minneapolis, Minn.

The following article has been written with the understanding that the larger proportion of the railroads are now paying their men on a flat rate basis. Under existing circumstances, can the painting be done by contract with economy to the company? On regular maintenance work, I will say No; but on improvement work exceeding a labor total of \$300 it can be done, and the results will be more satisfactory than they would be if done with the average regular division crew the railroads now employ, for—let us say—25 cents per hour, which I believe is a fair average of the wages paid by the railway companies for this line of work.

It is not my intention to start a discussion on the subject of employing competent men at the above rate, because we cannot do it, and if we are fortunate enough to have a man or two in the crew that knows his business, we have many more that know nothing, but who still receive the same rate as your man of efficiency.

These conditions alone cause the loss of thousands of dollars to the railroads annually. When one places two men together, one experienced, and one inexperienced, and each receiving the same rate per hour, at the end of the day he has the results of two inexperienced men in the amount of surface covered.

No doubt we all have seen the final results of this. In a short time we see our one-time competent man working for some contractor who has found out that it is just such men that he is obliged to employ in order to make anything in his business.

Consequently, I believe the work that is done by contract is done by more competent men than the company employees, which not only makes a difference in the appearance of work when completed but in durability as well. The cost of the work by contract is about the same as it would be if done by the company's own men.

I believe that it is the general practice of the different railway companies to furnish their own materials. Even though the labor is let by contract, especially where the company has adopted standard formulae in their colors and its own chemists have tested the materials, the railways are taking small chances with

with a contractor using substitutes or adulterations in the paint.

When a contractor employs his own men, and pays them what they are worth to him, he is not working under the handicap that a railroad employer is, but he can expect a man to paint a given amount of surface per day and at the same time do it well. When employing mechanics of this class, he can bid in work and complete it in better shape at a price not to exceed the amount that company forces require, and the company is getting more for the money expended.

#### A NEW DEPARTURE IN RED LEAD.

By A. H. SABIN,

Consulting Chemist, National Lead Company, New York.

For at least 100 years red lead has had a high reputation as a paint, especially to protect iron from rusting, but also, especially in England, as a priming coat on wood. This favorable opinion has not, however, been unanimous; it has been held by some that while it undoubtedly gave excellent results sometimes, in other cases it was not so successful. In explanation of this, it may be said it has long been known that red lead is not commercially, at least, a definite substance; it is commonly made from litharge, which is an oxide of lead, containing less oxygen than red lead. By a process of roasting in contact with air, the litharge takes up another portion of oxygen and is converted into red lead. In all red lead there is often as much as 30 per cent. and commonly not less than 15 per cent. of unchanged litharge.

Litharge is a yellow powder, made by roasting metallic (melted) lead in the air, with frequent stirring; it is naturally coarse and inclined to crystallize; when it is re-roasted to make red lead, each coarser particle does not get oxidized through, but contains a core of unchanged litharge surrounded by a coating of red lead. Obviously the way to avoid this is to have no coarse particles of litharge; this means that the latter should be ground to an impalpable powder before roasting; by this means we may produce red lead of almost any degree of purity we desire. Some 15 years ago the late William Jackson, then city engineer of Boston, told the writer that he had used red lead which had undergone some treatment preliminary to its final roasting, by which it became practically pure red lead, and that this made a paint much superior to ordinary red lead; at the time when he used it, above 20 years ago, he had found it impracticable to secure such red lead in a continuous supply. Recently Samuel Wagner, division engineer on the Philadelphia & Reading, informed me that some ten years ago, being dissatisfied with the paint in use, he had specified red lead to contain not less than 95 per cent. of true red lead. After considerable difficulty, he succeeded in getting such material, and had ever since used it where red lead was desired.

It is well known that in 1906 the American Society for Testing Materials applied 19 different paints to successive sections of the Pennsylvania bridge at Havre de Grace. After seven years' exposure, three paints are officially reported as constituting the first class, in each of which the active pigment is red lead, and in two of them the red lead contains not less than 97 per cent. of true red lead (the exact composition of the third is not known to the writer), thus clearly proving that a high-grade red lead makes an excellent paint not only for priming and body coats but also for the surface. Many people think that red lead does not make a good finishing coat, but evidently it does if it is the right kind of red lead. It is well known that on long exposure to the air red lead paint turns white; this is a superficial action, confined to a very thin layer, which is converted into ordinary white lead or carbonate by the carbonic acid in the air. White lead is such an opaque pigment that a very little of it makes the red surface change color, and this is often, though mistakenly, believed to indicate that the paint is injured. A little chrome green in the finishing coat, making a fine olive green color, or a little lampblack, which inclines it to brown or chocolate, will prevent this; and such a paint is not only pleasing to the eye but

of excellent lasting quality in most places. There are places, like the interior of train sheds, where the air is heavily charged with certain acids which attack lead, where the red lead body may be profitably covered with a good acid-proof paint; but for most places this is neither necessary nor desirable.

If it is conceded, as the evidence seems to prove, that this special high percentage red lead is a better paint, it is important to ask just how does it differ from the ordinary 85 per cent. or painters' red lead. The chemistry of the matter has been explained; but it may be pointed out that in a gallon of mixed red lead paint containing twenty pounds of dry red lead of the ordinary kind, there are about three pounds of litharge. One pound of litharge is enough to make about three gallons of a lead japan drier; so in a gallon of such paint there is enough litharge to make eight or ten gallons of drier. No wonder such paint hardens in the pail. Of course, the litharge is not as active as it is when made into a drier, but it is there, and it is the cause of the bad behavior of the paint. We all know that ordinary red lead paint is very difficult to apply properly; it quickly begins to thicken, and this makes it stiff in working and hard to brush out, and it lies unevenly on the surface; in one place too thick, and in another place much less; and the real protection is that of the areas where it is thin.

Now, a high-grade red lead, containing very little litharge, has little or no action on oil, and brushes out like white lead, making a smooth, uniform film, which gives uniform protection to the surface which it covers. As one result of this, a gallon of such paint will cover from a third to a half more surface than a gallon of the old kind; and as it is easy to apply, the painter can go over a half more square yards in a day's work. Being extremely fine, it makes a paint of good working quality; if necessary, it can be flowed on with a full brush, just as if it were white lead. Coal cars are sometimes painted in this way.

It is only recently that red lead of this quality has been available in considerable quantity; but now the National Lead Company is putting it up in paste form, ground with seven per cent. of oil, and put in steel packages exactly like paste white lead. It is not known that it will keep indefinitely, but I have seen it a year and in some cases a year and a half old, still in good condition; and no argument is needed to persuade a painter that paint which has been ground through a mill is of much better quality than if mixed from a dry pigment by hand. This paste red lead is sold at a price which makes a gallon cost from three to six per cent. more than that which is mixed by hand.

#### TREATMENT OF CONCRETE SURFACES.

By GEORGE WHIGELT.

To attempt the painting of concrete it is necessary to know something about the origin of the effervescent salts and alkalis, which are the destructive agents of paint materials applied over them. Those salts are commonly known as saltpetre, and are considered by chemists to be nitrates of sodium, carbonates of lime, etc., but as a matter of fact the real chemical nature of such exudations has not been established, and thereby lies the difficulty of a successful treatment. Whatever those salts may be, they sure belong to the alkalis which are the most destructive agents of paint materials.

All such salts are only destructive when active, and they are only active in connection with water. All new buildings or exposed surfaces contain moisture, and therefore we must attempt to overcome their destructive action by preventing moisture. Another matter to be considered in successfully treating such surfaces is to take into consideration the condition of the surroundings, possible percolation of moisture from the ground or outside, also the weather and climatic conditions. Another item of importance is vibration, which in itself is very destructive. A structure subject to moisture and vibration will show deterioration within a short time. Small particles of water enter into the pores of the surface, and continuous vibration will cause those particles of water to expand and explode. Such continuous



explosions, no matter how minute, will cause particles of concrete, brick or stone to break off and the structure is slowly but surely going toward its destruction. Sudden frosts also have the same action on exposed surfaces and will cause the checking off.

In considering the proper treatment of concrete to prevent the so-called saltpetre from destroying surface coating, it must be remembered that those salts, besides being alkalies, seem to have an acid reaction and are therefore much more difficult to combat than plain alkalies. In fact, I consider those salts a combination of acids and alkalies, which combination results in the formation of salts in crystal form.

The treatment for interior work is somewhat different from exterior work in that the subsequent coatings are generally of a different nature. For interior work, very often water colors or flat oil paints are used, whereas for exterior work water colors are entirely omitted and the oil paints used are of a different nature from the inside coatings.

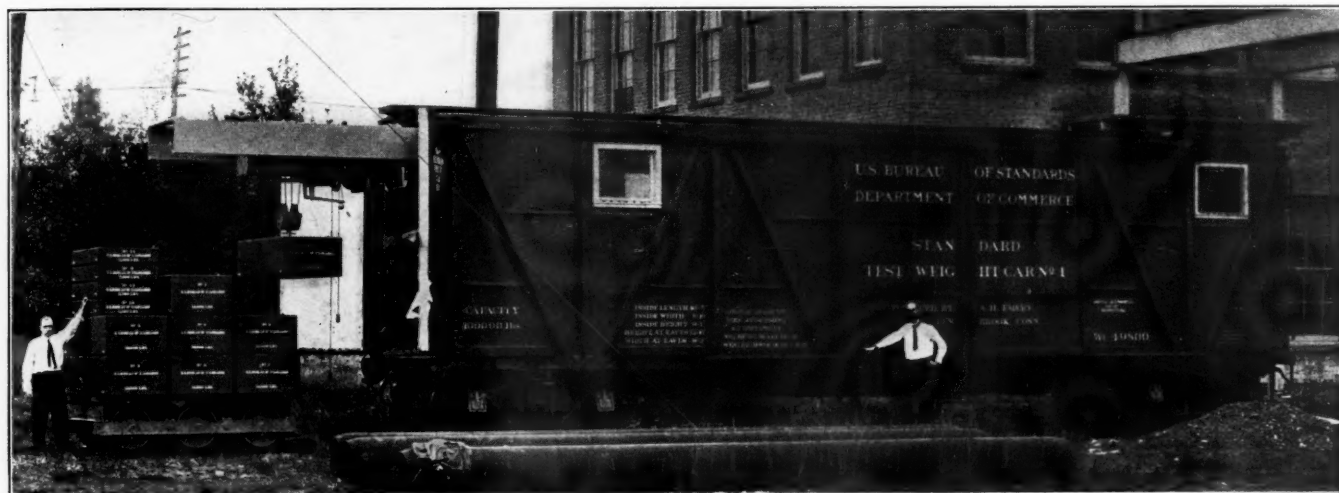
For new exterior work, no matter if the surface is of brick, stone, concrete, or a mixed construction, the first thing to be done is to thoroughly clean the surface from dirt, dust, grime, etc. Clear drying weather is always necessary for such work. After cleaning the surface a neutralizing agent must be applied to change the nature of the salts contained in the walls into a neutral chemical. For such purposes a number of neutralizers

## SCALE TEST CAR OF THE UNITED STATES BUREAU OF STANDARDS.

Ever since its inception the Bureau of Standards of the Department of Commerce has spent a great deal of time in studying the weights, measures and scales used in this country. The appropriations made last winter by Congress included an item for the study and testing of the railroad track scales of the country, and the bureau has just put into service its Test Weight Car No. 1. The equipment of this car, including the large standard weights, was designed and constructed by A. H. Emery, of Stamford, Conn., to meet the requirements given by L. A. Fischer, chief of the division of weights and measures of the Bureau of Standards, and C. A. Briggs, of the bureau, who has charge of the car.

The general idea of the apparatus is, briefly, a car equipped with a crane which can be projected out of one end of the car and which is equipped with a trolley and hoist. The car carries a motor-driven truck and 100,000 lbs. of standard weights. The crane, bridge, trolley and hoist and the truck are all operated from a gasoline motor and electric generator set, also carried in the car.

When in use the car is placed with the open end near the scale to be tested, the crane bridge is projected, the truck



Scale Test Car of U. S. Bureau of Standards.

are used. Fuming acids as well as certain salts can be used for this purpose. The fuming acids have the disadvantage of being dangerous and difficult to handle, and, as a rule, act on the subsequent coatings, resulting in an unsatisfactory job. Salts, such as oxalic acids have a bleaching and color destroying tendency, although oxalic is one of the strongest neutralizers, and if properly treated its bleaching effects can be overcome. Acetic acid acts only temporarily. White vitriol is well to be recommended, but it is not always strong enough in its action. The application of kerosene is sometimes of advantage, but not recommended when paint is to be applied as a final finish.

To be effective, all neutralizers, of whatever nature, must be first of all penetrating to go to the seat of the trouble. The first coats should also be of a penetrating nature, as a heavy layer of paint will only hide the trouble for a limited time and is more to be avoided than a poor finishing material itself.

Special prepared China wood oil, boiled linseed oil applied hot, greatly reduced Spar varnish, and where suitable benzole thinned liquids are the most effective materials for the purpose. Coloring matters should be left out of the first coating entirely. To finish up it is advisable to use a pure linseed oil paint made from pure lead with 20 to 30 per cent. of white zinc added. Instead of using an oil destroying drier of otherwise quality, I advise the use of a good varnish as a drying agent.

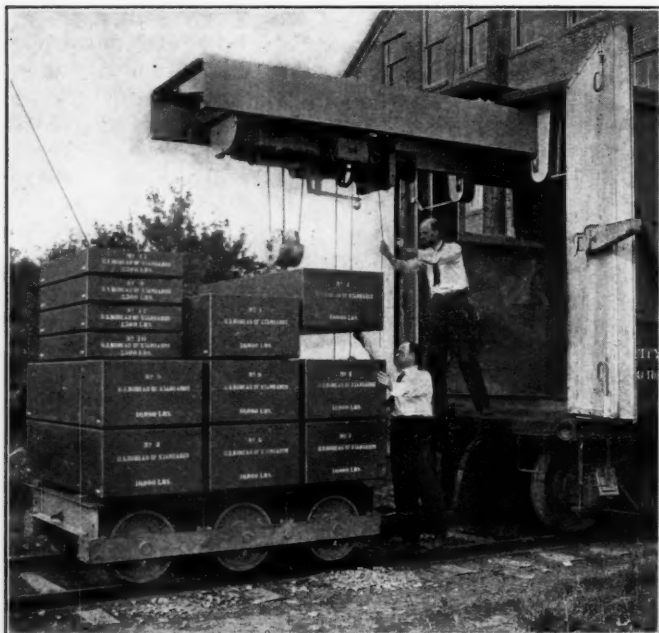
is lifted out of the car, placed on the rails and run onto the scale. Readings are taken and the truck is run back under the crane, where as many of the standard weights as may be desired are placed on it and it is again run out onto the scale and readings taken. The two illustrations show the car and also a closer view of the truck with its full complement of 90,000 lbs. of standard weights.

The car is of a standard heavy type with steel underframe, roof and doors and steel braced sides. One end is closed and heavily steel-reinforced, and the other end has two large doors as shown. A partition extends across the car about 10 ft. from its inner end forming a room which contains a 10 k. w. Sturtevant generator set, providing the power for operating the car and lighting it, a Davenport bed, water tank, wash bowl and toilet, stove, chair and folding table. The generator radiator and fan are carried in the other part of the car, as is also the storage battery, which is charged from the generator set and is used for lighting the car when the generator is not running.

A frame for carrying the crane bridge is built into the car at the open end. Two H-beams and two channels from the bottom and side members respectively, and two other H-beams bent to conform to the shape of the roof form the top member to which are fastened two castings which carry the

wheels on which the crane bridge runs. The need of this heavy construction will be apparent when it is considered that under certain circumstances the load on these two wheels may be 20,000 lbs.

At the partition there are two vertical 6 in. ship channels which carry castings and wheels for supporting that end of the crane bridge, and for holding it down when the overhanging load is great enough to overbalance its weight. The construction and general arrangement of the bridge, trolley and hoist are well shown in the illustrations. The bridge is projected by means of a motor driven screw fixed to the rear end of the car and a nut fastened to the side of the crane. The hoist is of 5 ton capacity, has a 5 horsepower motor and is transversed by a  $2\frac{1}{2}$  horsepower motor.



Truck, Standard Weights and Crane of Standard Scale Test Car.

The uprights at the partition are stayed to the rear end of the car by long rods, and the crane bridge can be bolted to these uprights for shipment. The trolley can also be bolted to the bridge. The truck is provided with a 5 horsepower motor with worm gearing, has a capacity of 50 tons, and is connected to the generator by the cable shown. This truck weighs slightly over 5,000 lbs.

There are eight 10,000 lb. weights, four 2,500 lb. weights, of cast iron, machined all over, painted and adjusted to exact weight. The probable error of the whole 90,000 lbs. is  $\pm 0.24$  lbs. and the average probable error of any one 10,000 lb. weight is  $\pm 0.08$  lb. Aside from this 90,000 lbs. of standard weights the car also carries 10,000 lbs. of 50 lb. weights in three boxes which are equipped with special handling apparatus so they can be easily removed from the car to a wagon and run about any town where the car may be.

**NEW PRUSSIAN TUNNEL.**—Some very interesting operations are in progress in connection with the building of the Distelrasen tunnel, on a deviation of the Prussian State railways, near Elm, which, when completed, will have a length of about two miles, and consequently be the second longest railway tunnel in Germany. Owing to the nature of the rock, great difficulties were met from the start, and work could only be proceeded with with the utmost precaution. It is expected that the tunnel will be finished by March, 1914. The total cost of the deviation, which is to be opened on May 1, 1914, will be \$3,750,000 in round figures, of which not less than \$2,375,000 will be represented by the cost of the tunnel.

## AN UNUSUAL FOUNDATION FAILURE.

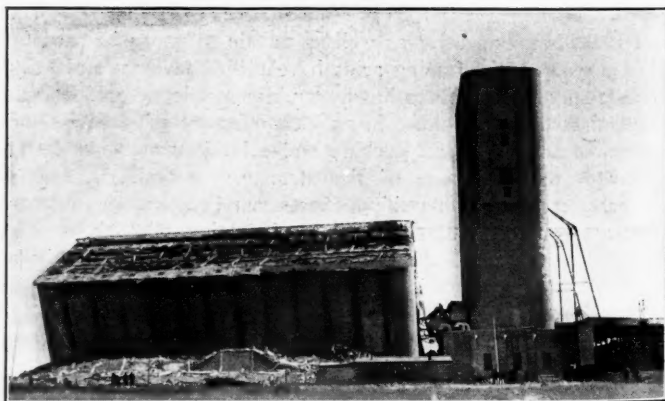
The very unusual failure of the foundation of the new Canadian-Pacific elevator at Transcona, near Winnipeg, has created a great deal of interest among engineers, the failure being due to the crushing of the foundation material under one side of the structure, permitting it to settle to the angle shown in the photographs. This movement was gradual and consumed about



Breaking of Ground Surface on Upper Side of Elevation.

24 hours. The early stages of the construction of this elevator were described in the *Railway Age Gazette* of April 18, 1913, page 889.

This elevator was built in 1912 and consisted of a working house and 65 circular bins of 14 ft. 4 in. inside diameter and 9 ft. high, of reinforced concrete. The working house was built 10 ft.



Looking Toward Inclined Bin After Roof Had Slid Off.

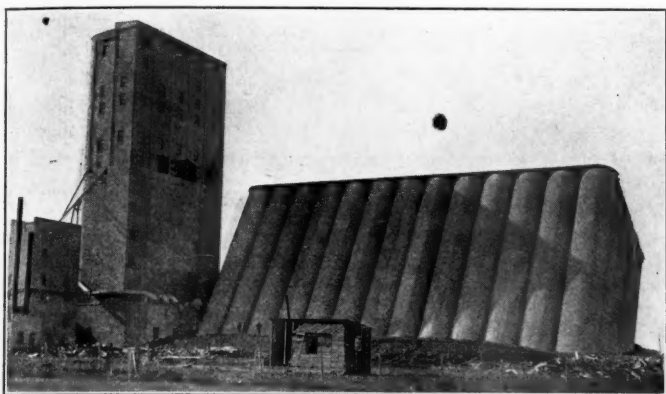
south of the bin house and entirely separate from it so that it was not damaged by the failure of the bins.

The underlying soil is a soft clay with rock 45 to 50 ft. below the surface. The bin house was carried on a reinforced concrete slab 77 ft. by 195 ft. about 12 ft. below the surface of the ground. Load tests made at the time of construction indicated that the soil could safely carry four to five tons per sq. ft. How-



ever, the maximum loaded weight of the structure at the time of failure averaged slightly over  $2\frac{1}{2}$  tons per sq. ft.

On Saturday, October 18, between 11 and 12 o'clock in the morning, when the elevator was practically full, a slight movement was noticed on the bridges connecting the working house and the bin house. By one o'clock in the afternoon the bin house had settled about one ft. and the ground for a distance of about 25 to 30 ft. on three sides of the bin house had risen four or five feet. The building continued to settle until noon of the following day, tipping to a final angle of 28 degs. from the vertical. In its final position the base at the east side of the structure is



View of Inclined Bin and Undamaged Headhouse.

about 5 ft. above the former level, while the west is about 30 ft. below.

At the time of the accident about 855,000 bu. of wheat were in the bins. To recover this grain a temporary conveyor belt was built on the upheaved ground along the west side of the structure underneath the overhanging bins. The side of the bins was then broken open, and the grain allowed to run out onto the belt which conveyed it to a chute delivering through a basement window of the handling house into one of the receiving legs which loaded it onto cars. As the grain was emptied from one bin, men went inside and opened the walls of the next. In this way the grain was removed from the top part of the different tanks. The angle of the bins from the vertical was



Closer View of Under Side of Bins.

practically the angle of repose of the wheat, and it was possible to remove a large proportion of the grain in this way.

The fact that the foundation mattress of the annex had settled below the foundation of the working house prohibited any attempt at excavation between the two houses. Therefore, while the wheat in the upper parts of the bins was being drawn off, excavation was made at the north end of the annex so as to allow access to one of the lower tunnel belts. The leveling up of this tunnel belt was completed ahead of the excavation so that a temporary elevating leg was erected to lift the grain from

the tunnel belt and deliver onto the temporary belt at the side of the house.

In the design of this storage house longitudinal walls on the mattress supported the bin bottoms. Four of these tunnels so formed by the walls were used for basement conveyer belts. The other tunnels between the belt tunnels had transverse walls under the contacts of the bins, which were undoubtedly responsible for the fact that no weakness appears to have developed in the basement. These tunnel walls were pierced at frequent intervals by openings allowing access from one tunnel to another. In drawing off the grain from the bins above the conveyer belt, which was being used to recover the grain, troughs or sluices allowed the grain to flow from the bottoms of the upper bins onto the belt, in this way affording a very economical means of recovering.

The use of the elevator cannot be resumed until the bins have either been reconstructed or moved back into their normal condition. Final procedure has not yet been fully decided upon. We are indebted to Frank Lee, principal assistant engineer, Canadian Pacific, for the above information and photographs.

### A SCOOP CAR FOR REMOVING SLIDES.

A scoop car has recently been designed and built by the Norfolk & Western for use in removing from the track earth and rock coming in from slides or dropping from the roof of a tunnel. This car is designed within the standard clearance limits and can be transported over the road without removing the roof or any of the crane rigging.

The car consists essentially of a 40-ton wooden flat car with a heavy wooden roof supported on steel framework. On the front end of the car is mounted a 25-ton revolving jib crane, adapted to handle a 10 cu. yd. scoop, which is pushed on the track in front of the car. A Lidgerwood hoisting engine, specially designed for this purpose, is located on the flat car. It has a lifting capacity of 17,000 lbs. at a speed of 30 ft. per minute and the swinging gear has a rope pull of 5,000 lbs. The engine is provided with one cable adapted to raise the scoop and another cable for revolving the jib crane. The hoist is provided with a 14-in. friction drum and has a double-acting brake. Regular vertical boilers 46 in. in diameter and 96 in. high are provided. The standard Lidgerwood swinging gear is installed. The car is further provided with a suitable water tank and coal space and is reinforced to provide the necessary strength for the severe duty imposed on the car.

The scoop is built of  $\frac{1}{2}$ -in. steel plates reinforced with angle irons and bars, and is provided with teeth at the front end to aid in entering a mass of material on the track. The scoop proper is carried in a frame or cradle which is composed of heavy steel bars.

A heavy 12 in. by 12 in. bumping timber suitably braced and supported is secured to the front end of the flat car near the rail. The frame or cradle for the scoop is hinged to this brace by a transverse pintle which allows play lengthwise of the car so there will be no binding when the cradle wears back into the wooden bumping timber. When in operation the front end of the cradle rests on the track, being supported by suitable wearing strips. The scoop, resting in this frame or cradle, may be hinged along either side, so that by raising the opposite side the entire contents of the scoop may be dumped along the side of the track.

The operation of the outfit is as follows: A locomotive is coupled behind the scoop car, and the front end of the cradle with the scoop in it is lowered so that it rides on the rail. The scoop is then pushed into the mass of material to be removed from the track and is filled with material. The clevises of the single-tree on the jib crane being attached to the front extremity of the cradle, the front end of this cradle is now raised a few inches above the rail, the scoop is withdrawn from the

mass of material and it is transported in this manner to a convenient place for dumping. The front end is then let down, a wedge-shaped timber being placed on the ends of the cross ties to support the cradle. The clevises are then removed from the front end of the cradle and are attached to suitable points on one side of the scoop. By raising this side of the scoop, the scoop being hinged to the opposite side of the cradle, the material in the scoop is dumped along the side of the track, the jib crane swinging around to follow the movement of the side of the scoop at the same time. The scoop is then returned to its proper position in the cradle and the outfit is ready for another trip. Rail clamps are provided for use where the load in the scoop is sufficient to overturn the front end of the car, but in ordinary service these are not needed.

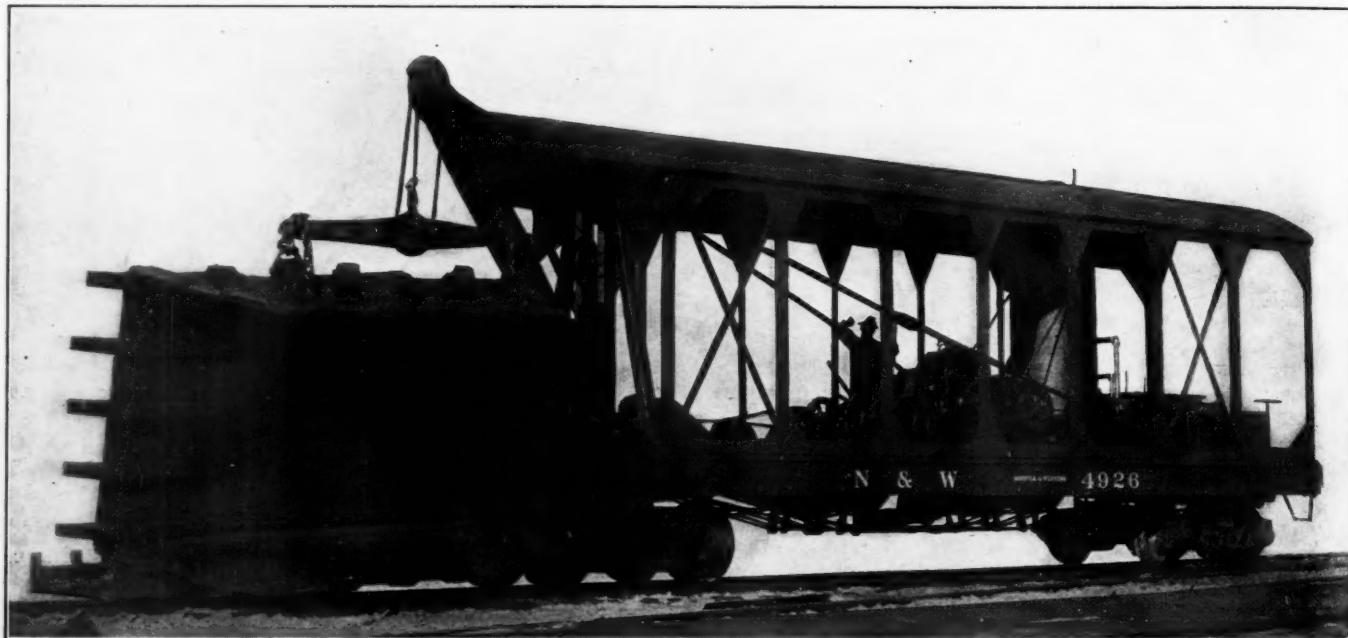
The amount of material on the track in a slide usually runs somewhere from 100 cu. yds. to 400 cu. yds., and is composed of a mixture of earth and stone, probably about two-thirds earth and one-third stone. The scoop is used on an average of about twice a year on a division. One locomotive is used in driving the scoop into the bank of material and the speed when striking is from 6 to 10 miles per hour. This ordinarily fills the scoop

car is a little light for the severe duty that is imposed upon it by this outfit.

There is also in use on this road another scoop car which consists of a plain scoop which is pushed along in front of a flat car into the bank of dirt. When filled this scoop is raised off the track and transported as in the latest arrangement, but, instead of dumping, the old scoop is simply set back upon the track, and as the sides are hinged, one or both of them are let down and the material shoveled off. This, however, requires 12 men and takes more time in addition to a trip.

Patents on both these outfits have been granted to L. E. Johnson, president of the Norfolk & Western, under whose direction they were designed.

**STORING EQUIPMENT.**—As the Panama Canal is nearing completion a large amount of construction equipment is being released for storage pending its disposal. A committee appointed to consider plans for storing this equipment has recommended that if it is impossible to procure sheltered storage space for steam shovels, locomotives, cranes, pile drivers and similar equipment, the arrangement of tracks in the Gamboa yard would be the



Scoop Car of the Norfolk & Western.

about two-thirds full and removes about 7 cu. yds. of material. The distance necessary to transport the material before dumping varies, of course, with the locality. In some instances it might be a few hundred feet while in others a mile or more.

It is customary to use seven men with the scoop car outfit, in addition to the regular train crew. One of these men acts as scoop car engineer, one is stationed on the front end of the scoop car to look after the filling and dumping, and the other five men are laborers who assist in cleaning the track and cleaning out the scoop, the material handled being sometimes of so viscous a nature that it will not readily dump from the scoop.

When transporting the empty scoop for a long distance the scoop and cradle are fastened together and the entire outfit may then be raised by the crane and loaded on an adjacent flat car. The two cars are then coupled together for ordinary train service. Small chains have also been provided to prevent the swinging of the boom in train service. The heavy roof over the outfit has been provided for the protection of the operator when engaged in tunnel work.

Two of these cars have been built and placed in service by the Norfolk & Western. These have been mounted on standard 40-ton wooden flat cars. If, however, more are built they will probably be placed on new 50-ton steel flat cars, as the wooden

most suitable location for this storage, especially in view of the facilities for readily switching out any particular piece. There is about 5,000 track ft. of storage space in the Gamboa yard, about 36,000 ft. of track in the yard and approaches to the relocation dumps between Gamboa Cabin and dump No. 7, and about 27,000 ft. on the dumps proper. It is believed that track can be provided at these points for all rolling stock as fast as it is retired from service.

**PROPOSED CAUCASUS TUNNEL.**—The administration of the Russian railways is seriously occupied with the project of a tunnel of gigantic proportions through the Caucasus mountains. This tunnel would have a length of 16 miles, and it has been already the object of a conference between Russian and foreign engineers. The geological structure of the mountain does not present any great obstacles. During the borings of the galleries no such difficulties will be encountered as during the borings of the Simplon tunnel. The temperature can be maintained at about 77 deg. Fahr. The elevation of the tunnel being between 4300 and 4650 feet, there is no danger of encountering subterranean water courses. The work will take about eight years. This undertaking would insure a direct connection between Vladikavkees and Tiflis.



# HEAVY MAINTENANCE WORK ON AN IN- DIAN RAILWAY.

The organization of the Royal Engineers, a branch of the British military force, includes two companies which are assigned to railway maintenance work. Although the standards of construction on Indian railways where these companies are engaged differ considerably from those familiar to American maintenance men, the following description of the relaying of a section of track  $4\frac{1}{2}$  miles long, as described in



Dismantling the Old Road.

the *Royal Engineers' Journal* for October, 1913, will doubtless be of interest.

The old track consisted of 75-lb. rails laid in 20-lb. chairs on wooden ties which had been in service about 10 years. It was found that these ties had been so badly eaten by white ants that in relaying the rail it was necessary also to replace all the ties. The 20-lb. chairs were not satisfactory for the heavy power in use on this line so 40-lb. chairs were laid on the new line. Deodar ties were spaced 2 ft. 2 in. center to center at the joints and 2 ft.  $6\frac{1}{2}$  in. between intermediate ties. This spacing is somewhat closer than standard in order to form a more rigid support for the heavy engines. For one short section where the maximum grade is four per cent., 100-lb. rails were used, although the remainder of the line was relaid with 75-lb. rails.

The forces employed for this work included 100 men of the twenty-sixth company and from 50 to 60 native coolies. Owing to the scarcity of men it was impossible to carry out all of the operations on one day so the system was adopted of removing the ballast from the old track and spiking on enough chairs in one day to last for two or three days' relaying. There was a speed restriction of 15 miles per hour over the whole section so that there was no danger in skeletoning one-half to one mile of track at a time. It was arranged to run most of the traffic at night so that the work could be carried on without interruption for eight hours, from 9 a. m. to 5 p. m., if necessary. The  $4\frac{1}{2}$  mile section was completed in 20 days, of which 12 days were occupied in relaying and eight in skeletoning the track, collecting material, etc. The company remained an additional five days to give the line a final raise and packing.

In removing the ballast to the level of the bottom of the ties, each "sapper," as the privates and non-commissioned

officers are called, averaged two rail lengths per day. The coolie labor barely averaged one length per man per day. The ballast consisted of river gravel mixed with sand which was tightly bound together, making it difficult to handle. The position of the chair on the tie was found by the use of a templet and marked. The position of the spike holes was then found by placing a chair in position and marking the tie through the holes, after which the holes were bored and the chairs spiked on. One sapper bored 100 ties with three holes in each tie and one sapper spiked 150 chairs with three spikes in each chair in a day. In putting in and taking out ties, three men were used per tie.

After the old rails had been turned out of the chairs by three men with bars, they were lifted and thrown clear by 12 men. Such a party was able to throw out one-half mile of rails in from  $\frac{1}{2}$  to  $\frac{3}{4}$  hour. The placing of the new rails in the chairs was the operation which limited the speed of the day's work. The chairs supplied were very tight between the jaws and the delay was experienced in getting the rails into all of the 12 chairs at once. The chairs spiked to the ties were roughly spaced and lined by a 100 ft. cord, the rail was then laid on the ties inside the chairs and all chairs were lined to it by pulling in the ties. The rail was then lifted onto the chairs and forced into each one separately by three men, two of whom were working with bars. No difficulty was experienced in putting in the opposite rail, as only the two end chairs were spiked before laying the rail, the remaining ones being slipped into their places afterwards. To secure the proper tie spacing the interval center to center of ties was marked off on the rail and the corresponding position then squared off on the opposite rail. In



Turning the Rail Over in the Chairs.

gaging the opposite rail, three men worked in a party. The fastest time made for gaging, boring and full spiking was one rail length in  $\frac{1}{2}$  hour. The average was about  $\frac{3}{4}$  hour.

On days when the new rail was to be laid, two fish bolts were removed from each joint before the arrival of the last train in the morning and the two remaining bolts were first eased and then tightened again to pass the train. The organization of the 100 men for the first half hour of the day's work was as follows: 12 men removing the remaining fish



Gaging Party.



Straightening the New Road.

bolts, 2 knocking out keys, 6 collecting nuts, fish bolts, keys, etc., 3 turning over rails, 12 lifting out rails, 20 lifting and throwing out ties, 12 cleaning and leveling the roadbed, 22 laying new ties, 6 alining and roughly spacing ties, and 5 collecting chairs, pins, keys, etc. Usually a half hour was sufficient for the dismantling and for the rest of the day the men were organized as follows: 14 men laying rails in chairs, 56 laying and spacing ties, 2 placing chairs in position, 12 laying opposite rail on two chairs, 2 distributing spikes and keys, 12 linking up fish plates, and 2 marking tie spacing on rail.

## REPAIRING BALLAST CARS.

By KEYSER.

The conditions under which the ballasting of railways is done vary to a considerable extent, depending on whether the line is under construction or is being rebuilt or repaired, the density of traffic, etc., but in too many cases little or no serious attention is given to the matter of repairing the cars used for such work. Ballast cars are very commonly treated as of small importance, and repairs which are really necessary are often allowed to pass with little or no attention, the fact that a broken or burned off journal or a trailing brake beam on such cars can cause just as much delay to traffic as a similar condition on any other class of car seeming to be overlooked.

When ballasting has to be done there seems to be objection on the part of some railway officers to putting on more than one or two extra car repairers to take care of the work of ballast car repairs. When a ballast pit is so located in relation to an established terminal that the repair work can be handled by the regular car repair staff, this policy, while it is to be deplored, is not so serious as in an isolated district, as the work can generally be done by overtime if necessary. But when the point of ballast supply is on an isolated branch or so located on a division as to necessitate the repair work being handled at or near the pit, it often becomes very serious. It is impossible for one or two car repairers to properly look after repairs to any great number of cars and the policy of letting bad order cars accumulate until there are enough to require a special train to move them to a terminal is a poor one, as is that of allowing the repairs to be entirely neglected.

In a case which came under the writer's notice, the work was handled with much satisfaction to all the departments concerned, and as there was not a single case of ballast car failure causing a delay to traffic during the three months the work was in progress, it was considered that the method followed was justified. The ballast pit was located a short distance off the main line. The track between the pit and the main line was little used and in such poor condition that the heavier locomotives could not be used, so that it was necessary to either double head on 28 car trains or haul only 14 cars in a train. There were two shovels in use and the haul varied in length from about 10 to 70 miles. The repair gang consisted of a foreman who also acted as inspector, a man who looked after air brake repairs and the keeping of the journal boxes well packed, two repair men and two helpers. All classes of repairs were handled except such work as repairing broken sills, and as there was only one case of this kind, the car was removed from service and left idle.

In the work of this nature there is often too little attention given to the matter of quarters for the men. In this instance there was of course, the regular assignment of boarding cars for the track men, etc., and a special car was carefully fitted up with bunks, mattresses, etc., for the exclusive use of the car and locomotive repair men, as much as possible of the locomotive repairs also being made at the pit. The meals were served with those of all the other men in the car provided for the purpose.

As soon as a train returned from a trip it was inspected and any bad order cars placed on a track provided for repair work. This track was located out of the way of the shovels on ground over which they had previously passed and the gravel made a good dry surface for the work. Adjacent to this track was a shorter one on which cars requiring wheels changed were placed. When inspecting a train, the foreman made a note of any cars which required only trivial repairs, such as brake wheels, renewal of nuts, etc., and later assigned a man to do this work in the train, thus avoiding much of the switching which would have been necessary had the cars been moved to the repair track. The man in charge of the ballast trains was notified twice a day as to what cars were again ready for service, and these were generally switched out and replaced in the trains at noon and in the evening. The man in charge of the oiling made it a point to examine the journals of each car once a day and hot boxes, one of the greatest bugbears of ballast train work, were almost unknown.

One of the most important considerations in work of this kind is that of supplies. The writer has seen ballast pits at which a material car was furnished containing a mass of bolts, brasses, wedges, etc., thrown in indiscriminately and causing no end of trouble and much wasted time in finding material when wanted. In this case two box cars were provided, one for general stores and one for oil. One side of each was boarded up and a good lock was applied to the door on the other side, with keys for the mechanical men only. The store car was arranged inside with boxes and pigeon holes and a good supply of each necessary size of bolt, etc., furnished. It is a mistake, in fitting up store cars, to provide material that is not likely to be used; it is in the way and takes up space which may be needed for such important material as draft timber bolts, brasses, etc. The oil car had racks for barrels and bins for waste and each man was held personally responsible for the neat and cleanly appearance of both cars. A daily inspection of the material on hand was made and the nearest terminal telegraphed for additions a sufficient time in advance to prevent the supply becoming entirely exhausted. Draft timber bolts, journal bearings, and oil and waste are among the most important items, and a good supply should always be kept on hand. Wheels were furnished a carload at a time, and were unloaded next to the wheel changing track, while three complete couplers were kept available at all times.

The man in charge of the car repair work at this ballast pit had had experience in a number of other pits and knew the conditions which generally obtain. In consequence he saw to it that his supply cars were furnished in an efficient manner and organized his staff along lines which he had worked out from his experience. The locomotive work was handled separately from the car repairs. The results proved most satisfactory, there being no failures of ballast cars on the road during the entire time that the work was in progress and a minimum of hot boxes. Enginemen knew, in starting out with a train, that the slack in the brakes was properly adjusted and that they did not need to take chances in making stops. The conditions were particularly appreciated by the trainmaster and other operating officers and the trainmen, when they learned that real efforts were being made to keep the car equipment in good shape, went out of their way to help in the work instead of using it as roughly as possible, as is more often the case. Considered from any viewpoint, the results obtained fully justified the efforts which were made.

RAILWAYS IN SHANTUNG, CHINA.—The details of the amalgamation of the Shantung Mining Company and the Shantung Railway have now been ascertained. The stockholders of the railway, in session at Berlin, voted to pay \$1,285,000 in railway shares to the shareholders of the mines. It is reported that the main offices will be removed from Germany to Tsingtau. The railway runs from the port of Tsingtau west to Tsinanfu.



## General News.

The roundhouse of the Minneapolis, St. Paul & Sault Ste. Marie at Portage, Wis., was burned on November 12.

The Chicago & Alton coal chutes at Kansas City, Mo., were destroyed by fire on November 13, together with several freight cars.

The car shops of the Boston & Maine at Fitchburg, Mass., were damaged by fire on the evening of November 10; loss, including damage to eight passenger cars, \$60,000.

R. C. Richards, general claim agent of the Chicago & North Western, addressed the Omaha Commercial Club on November 13, on the safety first movement. He urged a national law against trespassing.

The United States Civil Service Commission will hold examinations December 10, for the position of passenger rate clerk for the office of the Quartermaster of the Army, at St. Louis Mo.; salary, \$1,200.

At Boston, a week from next Sunday, Charles S. Mellen, former president of the New York, New Haven & Hartford, will hobnob with leaders of the railroad brotherhoods at a banquet, to be given in his honor and to which they have invited him. Can this be the same exclusive gentleman who failed to recognize his own general superintendent?

On the night of November 6, a bandit robbed the passengers in a Pullman car on the Burlington road, very near Omaha. On the night of November 17, a masked robber held possession of the mail car on a Southern Pacific train between San Jose and San Francisco, for more than an hour, having bound the clerks with ropes. He carried off the registered mail.

James J. Hill and J. M. Hannafor, the new president of the Northern Pacific, were given a complimentary banquet by the Portland (Ore.) Commercial Club on November 8, which was attended by a number of officers of the Hill lines who are making a western tour with Mr. Hill. Addresses were made by Mr. Hill, Mr. Hannafor, L. W. Hill and W. D. Fenton. Mr. Hill in his address urged the necessity of improved agricultural methods and declared that unless the hostile sentiment of legislatures, commissions and some classes of other people is changed the railways will be forced into the hands of the courts, which may lead to government ownership, and government ownership, he prophesied, would be the end of free government in America. "If the valuation which the government is taking of the railroads in the country is taken honestly," he said, "the figures will be much more than the par value of the stocks and bonds together. I know that in the case of the Great Northern we are paying taxes on \$112,000,000 more than we have stocks and bonds."

The United States Civil Service Commission announces examinations for senior and junior land appraisers to fill places under the Interstate Commerce Commission in the valuation of railroad property. Candidates for the position of senior appraiser—salary from \$1,800 to \$3,600—will be examined on written recommendations, which must be filed with the commission by December 22. Candidates for junior appraiser—salary from \$900 to \$1,500—will be examined at the usual places on January 7 next. The New York State Civil Service Commission will hold examinations November 29, for the positions of examiner and assistant examiner of accounts under the Public Service Commission of the Second District; salaries \$1,500 to \$2,400. For these positions the commission desires men between the ages of 25 and 35 who have had practical experience in accounting work on steam railroads; also those who have had experience on street and electric railways; also for three other classes of accounts, electrical corporations, gas corporations and telephone and telegraph corporations. These New York examinations are open to non-residents. Blanks may be secured from the commission at Albany.

The Seamen's bill, designed to make jobs for men belonging to the labor union which controls the destinies of the employees of coastwise and lake steamers, and which has already been passed by the upper house of Congress, prescribes regula-

tions which will be so onerous, as applied to steamers on the lakes and in New York bay, that, if the bill becomes a law, many of these vessels will have to go out of business. The steamers of the Central Railroad of New Jersey, for example, running between Manhattan and Sandy Hook, about 20 miles, wholly in New York bay, which are licensed to carry 2,000 or more passengers, would be required to have 100 lifeboats and a crew of 200 "able seamen" to man those boats in case of danger. The bill, as passed by the Senate, exempts vessels plying wholly in rivers and harbors. The lower part of New York bay is not classed as a harbor, but these vessels run in narrow dredged channels and on either side of these channels the water is so shallow that the vessels could not sink below the water level. Moreover, a vessel in distress can get aid from others in a very few minutes, steam craft of all kinds being always within easy call. The bill was introduced by Senator LaFollette, and is known as S-136. It stipulates that the seamen called for by it must each have had three years' experience on the high seas. Except in the heaviest days of the summer these vessels are loaded far short of their capacity; and in the autumn, when traffic is light, a crew made up as prescribed by this law would, in many cases, be much more numerous than the passengers.

### Standing of Engineering Candidates.

The United States Civil Service Commission finds that of 481 candidates for the position of senior civil engineer, first grade, in the valuation department of the Interstate Commerce Commission, 305 can be marked 80, or above, and 176 between 70 and 80. Whether or not there were candidates (outside the 481) who graded below 70, is not stated, the gradings, by districts, including first and second grades, and also the gradings of structural engineers and signal engineers are given in the following table:

Senior Civil Engineers.	Above 90	80 to 90	70 to 80
District No. I:			
First grade .....	15	82	53
Second grade .....	..	26	86
District No. II:			
First grade .....	12	35	32
Second grade .....	..	14	32
District No. III:			
First grade .....	8	53	29
Second grade .....	..	22	43
District No. IV:			
First grade .....	10	38	36
Second grade .....	..	32	46
District No. V:			
First grade .....	9	43	26
Second grade .....	..	13	65
Total .....	54	358	448
Senior Structural Engineers.			
First grade .....	12	28	17
Second grade .....	..	22	27
Senior Railway Signal Engineers.			
First grade .....	2	13	3
Second grade .....	..	6	31

On request of the Interstate Commerce Commission, candidates may be transferred from one district to another.

All five of the district valuation engineers of the Interstate Commerce Commission have now opened offices in their respective headquarters, and appointments for staff positions are to be made in a few weeks from the list of eligibles.

### The Cause of Automobile Accidents at Highway Crossings.

While actual statistics show that only 1½ per cent. of automobile accidents occur at railway crossings, nevertheless this 1½ per cent. is so large that automobile associations are co-operating with the railroads to minimize the number and stimulate greater care on the part of pedestrians and drivers of motor vehicles. In making an effort to ascertain wherein the responsibility for crossing accidents might rest, some observations were recently made by one of the railroads with office in San Francisco, and the statement of the results, involving 16,522 motor vehicles, 4,246 teams and 4,528 pedestrians, shows that 69 per cent. of the drivers of motor vehicles took no precautions whatever to prevent being struck at crossings, 21 per cent. passing at a high rate of speed. The observations were made in San Francisco, Lodi, Stockton, Oakland and Sacramento. The total of the pedestrians and drivers of teams and motor vehicles who crossed during the

period of observation was 25,296. Of this number 35 stopped and looked in both directions before crossing; 8,950 kept moving and looked in both directions; 1,694 kept moving and looked in one way only, and 14,617 kept moving and looked straight ahead.

#### The Course in Railroadng.

Walker M. Van Riper, who has made a study of legislation affecting railroads and public service corporations, tells this: "At a time when the legislature of the new state of Arizona was passing a big batch of bills affecting railroads, a young man called on President Wilde of the University of Arizona, and asked him if a course of instruction in the railroad business could be had in the university. The president said perhaps it could be arranged, and the young man then asked how long it would take and how much it would cost.

"That depends on how much you want to learn," President Wilde told him. "If you want to learn as much as a division superintendent knows, it will take 10 years and cost you \$10,000. If you want to know as much about the railroad business as the Arizona legislature knows, it will take 15 minutes and will cost you 75 cents."—*St. Louis Post Dispatch*.

#### The First Pullman Car.

Fifty-six years ago J. L. Barnes, of Chanute, Kan., was a conductor on the first Pullman car ever run. He made the trip between Bloomington, Ill., and Chicago over the Chicago & Alton on the night of September 1, 1857, and one of his passengers was George M. Pullman. Mr. Barnes recalls that Mr. Pullman on the next morning was somewhat doubtful as to the ultimate success of his invention. Mr. Barnes is 78 years old and it would probably be rather unfair to visit him with the punishment to which he is clearly entitled, but he told how he stood idly by and permitted the first Pullman porter in history to maltreat a passenger with a whisk broom and collect the original Pullman tip. He was a husky lad of 22 summers at that time and his muscles were in a good state of vigor, but he did not interfere.

The car was a remodelled day coach and there were built four compartments, eight berths, four upper and four lower. The people of Bloomington, little reckoning that history was being made in their midst, did not come down to the station to see the car. There was no crowd and the car, lighted by candles, moved away in solitary grandeur, if such it might be called.

Mr. Barnes retired as division superintendent of the Atchison, Topeka & Santa Fe in 1910, after a railroad service covering fifty-six years.—*Exchange*.

#### Canada's New Transcontinental Railroad.

With a gap of but a few miles to fill in before all of the steel of that portion of the National Transcontinental Railway for which the government is responsible has been laid down, its construction thus far has cost Canada in round figures, \$135,000,000. The estimated cost of the road at its completion, about September 1914, is placed by the engineers at \$150,000,000. This does not include the cost of the Quebec bridge, which in one sense is a part of the road. The amounts of money paid out of the consolidated revenue of the Dominion each year since 1904 towards the construction of the road, are as follows:

1904.....	\$6,249	1910.....	\$19,968,064
1905.....	778,491	1911.....	23,487,986
1906.....	1,841,269	1912.....	21,110,352
1907.....	5,537,867	1913.....	18,787,059
1908.....	18,910,253		
1909.....	24,892,351	Total .....	\$135,319,945

#### A Weekly Bulletin for Agents and Yard Masters.

To keep a large mass of facts well in hand requires system, review and study; and especially is this true where the facts change, from day to day, like a kaleidoscope, as in the operation of a railroad. Station agents and yardmasters should review their fields frequently. On the Chesapeake & Ohio they are aided in doing this by a weekly bulletin from E. P. Goodwin, superintendent of transportation. From a recent issue of this bulletin we extract the following typical paragraphs:

**Box Cars.**—Shortage about 450. You have pulled this down from 1,300. Keep pulling until you make a surplus. We then get both revenues and per diem. *Don't* hold a car for tomor-

row's loading when you can unload one that will do for the same order. *Don't* delay placing for unloading and pulling when loaded. *Don't* tie up cars with company's material.

**Flat Cars.**—If you can not load *at once*, the Greenbrier District can.

**Stock and Coke Cars.**—The 500 leased stock (Nos. 90500 to 90599) should put us on Easy Street. Take care of local requirements; then, the farther you load them off line the more money we make.

**Coalers.**—This is serious. It would take the National Militia to drive them home, therefore, it is strictly up to *you* to save every day, hour and minute. Make up in efficiency what we lack in equipment.

**Personal.**—Our passenger trains and time freight trains are not making the record they should. There is possibly a thousand things that go to make up delays. Are you responsible for any one of this thousand? Recently noticed car on Big Four delayed two months waiting on a bill from C. & O. Just figure what that consignor and consignee are saying about railroad service. Noticed car delayed 18 days for S. A. L., another mix-up of billing. Noticed frequently cars with company's material held 10 to 20 days *for unloading*.

#### Lives Saved on the North Western.

On the Chicago & North Western the "Safety First" movement has now been in vogue over three years and the company has issued a statement showing the reduction in the number of personal casualties in a period of three years and four months, a record for a longer time than has been published by any other road. The record is for forty months ending October 31, 1913, as compared with forty months at the rate shown in the records for the twelve months ending June 30, 1910, and is as follows:

	Per cent.
40 fewer trainmen killed, a decrease of.....	30.8
4,327 fewer trainmen injured, a decrease of.....	40.0
22 fewer switchmen killed, a decrease of.....	36.1
458 fewer switchmen injured, a decrease of.....	19.8
19 fewer stationmen killed, a decrease of.....	79.1
593 fewer stationmen injured, a decrease of.....	22.7
34 fewer trackmen killed, a decrease of.....	34.7
1,463 fewer trackmen injured, a decrease of.....	24.7
2 fewer bridgemen killed, a decrease of.....	18.2
102 fewer bridgemen injured, a decrease of.....	11.8
560 fewer shop and roundhouse men injured, a decrease of.....	12.7

There were increases as follows: 2 car repairers killed, 366 car repairers injured, 2 shop men killed, 5 unclassified employees killed, 68 unclassified employees injured, and 7 passengers killed.

A summary shows 261 fewer persons killed, a decrease of 21.6 per cent., and 7,706 fewer persons injured, a decrease of 22.7 per cent.

#### Chicago Terminal Problem.

Bion J. Arnold, who sometime ago was engaged by the Citizens' Committee to make a study of the railway terminals of Chicago and to review the report on the same subject made by J. F. Wallace, submitted his report to the Council Committee on Terminals last Tuesday. Mr. Arnold recommends that the city grant no ordinances that do not conform to a satisfactory and harmonious scheme for the rearrangement of terminals. He favors a plan under which all the roads on the south side of the city would use the Illinois Central Terminal and those on the west side join in building on a site west of the river at Harrison street. With the new station of the North Western this would make three terminals in the city. The entire terminal situation is reviewed at length, with elaborate detailed studies. A comprehensive plan for reorganization is worked out, with several alternative plans. Provision is made for the connection of all the stations with each other by subway lines, and the plans contemplate a possible through routing of suburban trains.

#### Length of Service of North Western Officials.

Twenty-seven of the general officers of the Chicago & North Western had a dinner at the Union League Club, Chicago, on November 10, for the purpose of holding a "family council" on the affairs of the company and of getting together socially, as it is their practice to do occasionally. During the dinner the fact that a large proportion of them had spent most of their active railway careers on the North Western was discussed, and it was suggested that each one write on a card that was circulated, the number of years he had been with the com-



pany. The total of years of service was 724, or an average of 27 years for each officer present. The longest period of service with the company was 44 years. There was one period of 43 years, three of 40, one of 36, three of 35 and one of 34.

A list of those present, with the year on which each entered the service of the North Western, and his first position with the road is as follows:

W. A. Gardner, president, 1878, clerk.  
 R. H. Aishton, vice-president, 1878, axman.  
 H. R. McCullough, vice-president, 1880, in general freight department.  
 A. C. Johnson, passenger traffic manager, 1894, special agent.  
 C. A. Cairns, general passenger and ticket agent, 1892, in general passenger department.  
 E. D. Brigham, assistant freight traffic manager, 1873, telegrapher.  
 W. D. Cantillon, general manager, lines east of Missouri river, 1878, brakeman.  
 Frank Walters, general manager, lines west of Missouri river, 1902, assistant superintendent.  
 S. G. Strickland, assistant general manager, 1880, telegrapher.  
 Walter J. Towne, general superintendent, lines east of Missouri river, 1897, assistant engineer on construction.  
 George B. Vilas, assistant general superintendent, lines east of Missouri river, 1909, station work.  
 L. S. Carroll, general purchasing agent, 1884, station helper.  
 W. M. Carroll, general storekeeper, 1889, clerk.  
 Ralph C. Richards, general claim agent, 1870, office boy.  
 H. C. Howe, freight claim agent, 1884, bill clerk.  
 Robert Quayle, general superintendent motive power and car departments, 1871, machinist apprentice.  
 H. T. Bentley, superintendent motive power and machinery, 1892, machinist.  
 C. A. Schroyer, superintendent car department, 1886, assistant superintendent car department.  
 A. B. Jones, local treasurer, 1884, office boy.  
 William Bennett, superintendent of telegraph, 1869, telegraph messenger.  
 E. E. Betts, superintendent transportation, 1888, office boy.  
 T. H. Goodnow, assistant superintendent car department, 1912, assistant superintendent car department.  
 Charles D. Brandriff, general auditor, 1897, clerk.  
 H. H. Decker, engineer of maintenance, 1899, rodman.  
 L. J. Putnam, assistant chief engineer, 1899, instrumentman.  
 F. H. Hammill, assistant general superintendent, 1886, telegrapher.

#### Disastrous Wreck at Clayton, Ala.

In the derailment of a northbound excursion train on the Central of Georgia near Clayton, Ala., on the 13th of November, nine passengers were killed and 200 or more were injured. Six of the injuries are classed as fatal; the seriously injured number about 40. The train was running at good speed and the three rear coaches ran off the track at a curve. These coaches were crowded with passengers and they fell down a bank 40 ft. high. The frames of the cars were wrecked and hardly a single person escaped injury. Of the five cars in the train the two leading cars, with the locomotive, remained on the track.

The immediate cause of the derailment was a broken rail; but it is said that the ties were in very poor condition.

The railroad company, in accordance with its custom, asked a committee of citizens to take part in the investigation following the wreck, but when the hearings were closed, and the officers of the road were ready with a decision holding that a broken rail was responsible for the wreck, the citizens refused to agree to that conclusion, holding that probably a faulty roadbed was the cause. The citizens' committee was composed of Judge of Probate T. D. Grubbs, T. M. Patterson, mayor of Clayton, and O. B. Pruett, a merchant.

The Birmingham *Age-Herald* in its report of the investigation says:

"There can be no doubt that the wreck was caused by a broken rail, but there is every reason to believe that the rail broke for want of proper support. The cross ties at the point where the three coaches left the track are nearly all in a bad condition. This was shown when the Clayton committee, appointed to assist in the public investigation, visited the scene of the accident this afternoon [November 14]. An examination of the track showed that nearly one out of every three or four of the ties was rotten, some of them being in so dilapidated a condition as to crumble at the ends when kicked. Mr. Pruett, one of the committee, kicked the end off four or five of the ties within a space of a dozen yards."

The section master testified that the train was running about 40 miles an hour.

The general manager of the road gave out a statement in which he said:

"The usual equipment of the train was one coach and one combination car. The train on this occasion consisted of four coaches and one combination car, and was crowded with between 400 and 500 excursionists going to the county fair at Eufaula. The

attendance on Tuesday and Wednesday had been small, and no information had been received that such a large crowd would travel to the fair on Thursday; otherwise, more ample accommodations could and would have been furnished.

"The train was running only five minutes late at Clayton, and consumed 10 or 12 minutes in running the 3½ miles from Clayton to the point where the accident occurred. The derailment occurred on a descending grade and on a 2 deg. curve. It is hardly probable, therefore, that the train was running more than 30 miles an hour, which was neither unusual nor excessive speed.

"The engineer states that he felt the broken rail as he passed over it and applied the brakes. The engine and two cars passed safely over the break and the three rear cars were derailed and turned over, two turning over on one side of the embankment and one on the other. The track was laid with 56-lb. steel rails, on pine and cypress ties, which were reported in good condition.

"The latest report is to the effect that as the result of the accident there have been nine deaths. [Names given.] . . .

The officers of the company greatly deplore the accident and are doing everything in their power for the relief and care of the injured."

#### Train Service Demoralized By Ohio Storm.

Railway service through the northern part of Ohio and particularly in the vicinity of Cleveland, was badly demoralized on Sunday, Monday and Tuesday of last week, November 9, 10 and 11, by the worst storm that the region has known for many years. At Cleveland twenty-four inches of snow fell during the three days, accompanied by a gale that overthrew telegraph wires and piled up drifts that completely blocked the railways for many hours, and made the train service very irregular for four days.

The worst effects of the storm on railway operation were felt in the district between Ashtabula and Elyria and south of those points. In Cleveland the snow was drifted so deep and so many wires and poles fell across the streets that street car service was almost entirely discontinued, and even the downtown streets were blocked. Telegraph service along the line of the New York, Chicago & St. Louis was destroyed for a distance of over 100 miles, and similar conditions prevailed on other lines, while all local telephone and telegraph service was destroyed, and even after tracks had been somewhat cleared it was necessary for operating officers to go out in light engines to ascertain conditions. On Monday the New York Central offices in Chicago had no communication east of Toledo. For two days Cleveland was almost isolated. Through trains passing through the city were from 12 to 28 hours late, the Twentieth Century Limited arriving in Chicago on Monday at 5 p. m., and trains originating at Cleveland were annulled by the Lake Shore, Big Four and Pennsylvania. Cuts filled with drifts made the tracks impassable and telegraph poles fallen across the right of way amid a tangle of wires added to the difficulty. Train crews were obliged to make their way as best they could without running orders and the officers in many cases knew nothing of where the trains were. A train that left Cleveland for Pittsburgh proceeded for two hours and was then stalled for twenty-six hours.

On Tuesday all roads operated trains out of the city irregularly and on Wednesday conditions were greatly improved by a cessation of the snowfall. As the efforts of the railways were concentrated on the passenger trains few freight trains were moved in the vicinity of Cleveland, and for two or three days the city was seriously threatened with a shortage of food.

#### American Railway Association.

The fall meeting of the American Railway Association was held at the Blackstone, Chicago, on Wednesday of this week, the representation being 210 members by 200 delegates.

The executive committee reported that the membership now comprises 402 members operating 269,317 miles of road, an increase of 43 members and 2,045 miles. The associate membership now comprises 146 members operating 8,513 miles, an increase of 8 members and 447 miles. The increase in the number is largely due to changes which have been caused by

the new provisions for membership under article 4 of the articles of organization.

The executive committee reported that Arthur Hale had been reappointed general agent of the association for the ensuing two years.

In accordance with the request of the executive committee to report upon a workable organization of "safety first" committees on railroads, conclusions and recommendations were submitted by the executive committee to the association and approved at the session held last May. A circular has been issued by the committee to the members of the association, in order to ascertain what progress has been made in this movement. A further report will be submitted on the subject at a later meeting. Amendments to sections 5 and 4 of the detour agreement were presented, which were approved by the association.

The committee reported in connection with the work of revision of the standard code of train rules, that it has obtained from the members of the association copies of the rules in actual force upon their lines, which were compared and reported upon by an experienced examiner of trainmen of a railway having a heavy traffic. The committee has also been aided by an auxiliary committee of active railway officers who are in daily touch with the problems of transportation.

The committee reported that in its opinion the present code as it stands has proved satisfactory, when properly interpreted and rigidly adhered to. It is where its provisions have been disobeyed that disasters have followed; and before recommending any changes the committee feels that it must be thoroughly satisfied as to the advantage which will be gained in the direction of either safety or efficiency.

The committee on maintenance reported that the question of modifying the specification for carbon steel rails, as provisionally approved by the association in November, 1912, to provide for a variation of  $\frac{3}{8}$  in. from the specified length instead of  $\frac{1}{4}$  in. has been referred to the American Railway Engineering Association for its consideration and recommendation.

The question of the contour of chilled car wheels and the throat clearances for frogs, cross overs and guard rails has been referred to the American Railway Engineering Association and the Master Car Builders' Association jointly for a full investigation and report.

In order to obtain full information as to the present practice, the committee has issued a circular of inquiry on switchstand clearances.

The attention of the committee has been called to the fact that a worsted test for color perception, which is claimed to be the standard of the American Railway Association, is being offered to the railroads which does not conform to the standard as prescribed by the association. It is of the first importance that primary standards only should be used; those which have been established by the proper tests and certified to for distribution to the members of the association; and this can only be accomplished by having the equipment examined and certified to by the official examiner selected by the committee.

The committee stated that the subject of the standard dimensions of box cars is still under consideration, and a circular has been issued in order to ascertain the views of the members relative to the advisability of changing the present standard inside dimension, viz: 36 ft. in length, 8 ft. 6 in. in width, and 8 ft. in height to 40 ft. 6 in. in length, 8 ft. 6 in. in width and 9 ft. in height, with maximum outside dimensions of 9 ft. 2 in. in width at 13 ft. above the top of the rail, and 9 ft. in height. The committee hopes to be able to present a final report next May.

The committee also included in this report a summary of replies to circular No. 1317, respecting the number of freight cars, passenger cars and locomotives equipped with safety appliances as required by the United States safety appliance standards, as of July 1, 1913.

The joint committee on automatic train stops presented a revision of the "requisites of installation" for automatic train control, etc., in which a number of changes have been made from those tentatively reported at the May meeting of the association. After the discussion the report was referred back to the joint committee for further consideration.

The committee on the safe transportation of explosives and other dangerous articles reported that F. G. Shepard, vice-president, Missouri Pacific, and M. C. Kennedy, president, Cumber-

land Valley, have been elected as members thereof to fill vacancies.

The hearing appointed by the Interstate Commerce Commission to consider proposed amendments to the regulations for the transportation of explosives and dangerous articles was postponed at the suggestion of the committee. No date for the hearing has as yet been set. The committee reported that since the last meeting the American Express Company, Globe Express, Great Northern Express Company, Northern Express Company, and Wells Fargo & Company Express have become members of the bureau of explosives.

The committee on electrical working reported that it is giving attention to the questions of overhead working conductors clearances and to the clearances for automatic train stops.

The committee desires that conclusions as to these questions shall be reached by the railway technical associations, which are also considering them, before recommending action to the association.

The entire afternoon session was taken up with consideration of the report of the Committee on Relations Between Railways. A wide variance of opinion developed regarding the recommendation relative to changes proposed in the per diem reclaim rule, and adjournment was taken to December 3, when another meeting will be held in Chicago to settle this matter.

D. L. Bush, vice-president of the Chicago, Milwaukee & St. Paul, and C. W. Galloway, general manager of the Baltimore & Ohio, were elected members of the committee on nominations. The Canadian Pacific, the Chicago, Rock Island & Pacific and the Philadelphia & Reading were elected members of the committee on safe transportation of explosives and other dangerous articles. The Baltimore & Ohio and the Chicago, Milwaukee & St. Paul were elected members of the committee on electrical working. The spring meeting will be held in New York, May 20, 1914.

#### American Society of Mechanical Engineers.

The annual meeting of the American Society of Mechanical Engineers will be held in New York, December 2-5. On the evening of December 2 there will be the presidential address, followed by a reception. On the morning of December 3 there will be a business meeting, followed by professional session, with the following papers: Notes on the Further Operation of Large Boilers of the Detroit Edison Company, by J. W. Parker; On Setting Tasks for Firemen and Maintaining High Efficiency in Boiler Plants, by Walter N. Polakov, and Properties of Steam, by R. C. H. Heck. In the afternoon the railroad session will be held at which the following papers will be presented: Steel Underframe Box Cars, by G. W. Rink, and Steel Frame Box Cars, by R. W. Burnett. The cement and textile sessions will be held simultaneously with the railroad session. In the evening there will be the presentation of the Grashof medal by the Verein Deutscher Ingenieure to George Westinghouse, past-president and honorary member, the American Society of Mechanical Engineers, which will be followed by an address, illustrated by lantern views, on Leonardo da Vinci—Engineer and Artist, by John W. Lieb, Jr., past president, American Institute of Electrical Engineers, and past vice-president, the American Society of Mechanical Engineers.

On the morning of December 4 the following papers will be presented: Efficiency of Rope Driving as a Means of Power Transmission, by E. H. Ahara; Comparative Tests of Three Types of Lineshaft Bearings, by Carl C. Thomas, E. R. Maurer and L. E. Kelso; Pitot Tubes for Gas Measurements, by W. C. Rowse; Tests of Vacuum Cleaning Systems, by J. R. McColl; Tests Upon the Transmission of Heat in Vacuum Evaporators, by E. W. Kerr; and The Art of Enameling, or the Coating of Steel and Iron with Glass, by Raymond F. Nailler. On the same morning will be held the machine shop practice session at which papers will be presented on Continuous Manufacturing by Placing Machines in Accordance with Sequence of Operations, by Oscar F. Bornholt; Gears for Machine-Tool Drives, by John Parker; Cast-Iron for Machine-Tool Parts, by Henry M. Wood, and A Record of Pressed Fits, by C. F. MacGill. The gas power session will also be held on the morning of December 4. On the afternoon of December 4 there will be excursions to points of interest in New York



and vicinity. On that evening there will be a German dinner, reproducing one of the menus from the trip abroad, and will be held at the Deutscher Liederkrantz at half past six o'clock. A brief account of the trip illustrated by lantern slides will be given by Past President Worcester R. Warner. An informal dance will follow the dinner as was customary in Germany.

On the morning of December 5 there will be the fire protection session at which the following papers will be presented: The Fire Hazard in Turbo-Generators, by G. S. Lawler; Extinguishing Fires in Oils and Volatile Liquids, by Edw. A. Barrier; and Control of Automatic Sprinkler Valves, by Fred J. Miller. On that afternoon there will be excursions to points of interest in New York and vicinity, followed in the evening by college reunions.

#### Special Committee on the Relations of Railway Operation to Legislation.

The semi-annual meeting of the Special Committee on the Relations of Railway Operation to Legislation was held in Chicago, November 19. The report rendered showed that 333 railroads, having a total mileage of 223,675 miles, were supporting the work of the committee. Details of bills affecting operation now pending in congress were also shown and the committee said that it was satisfied that a number of these bills will be passed at the session of congress which will convene in December. The committee added that other subjects would be brought up and that very broad additions to the discretionary power of the Interstate Commerce Commission over railway operation would be proposed. Chairman W. J. Jackson, in a brief address, said that the committee had offered to present the views of railways on the intricate subject of enlarging the powers of the Interstate Commerce Commission over operations to the commission, but that the commission could not see its way clear to discuss the matter with the men who were prepared to meet it. Mr. Jackson said that it was therefore the purpose of the committee to ask the same body of men to present this matter before the committee of congress; as it has, to do with such matters as legislation making compulsory the adoption of steel passenger cars, the reduction of clearances and extension of block signals, and the installation of automatic stops, with other legislation affecting operation, involving expenditures estimated at more than two billion dollars. "It would," said Mr. Jackson, "appear unthinkable that congress will take the responsibility of ordering these without giving very grave consideration to the question of where the funds are to be secured, and to the effect on the continuance of capital expenditures, which should be made in other directions for the proper handling of traffic. The alternative is obviously the delegation of wide discretionary powers over operation to the Interstate Commerce Commission. At the present time congress may enact legislation involving expenditure of those huge sums while the commission can prevent increases in revenues which must be obtained before money can be secured. Under these circumstances it is most essential that the roads stand ready to respond promptly to calls for witnesses by sending the most efficient men available for that service. It is also urged that very serious consideration be given to the question whether approval should be given to the general proposition to extend the powers of the commission.

#### Central and Western Association of Car Service Officers.

The semi-annual meeting of the Central and Western Association of Car Service Officers was held at the Hotel La Salle, Chicago, on November 13, with President D. C. Fredericks, superintendent of transportation of the Chicago, Peoria & St. Louis, in the chair.

Reports were received from the committee on office methods and accounting and the committee on per diem rules.

Following the reports of the committees there was a general discussion of M. C. B. Rule 120, providing for the disposition of unserviceable cars, with reference to the method of billing for the rate of 2½ cents per mile for the transportation home empty. Arthur Hale, chairman of the Committee on Relations Between Railways of the American Railway Association, said that the Interstate Commerce Commission had issued a conference ruling

that the 2½ cent charge is not a freight rate but a reciprocal charge, that goes into the miscellaneous freight receipts but cannot be used on a regular waybill. Some other way must therefore be devised for handling it. He could see no difficulty in settling by bill and voucher.

J. R. Pickering, superintendent of car service of the Chicago, Rock Island & Pacific, suggested the use of an interline empty car way-bill, with a coupon for each handling road, on which to bill the car through to destination after having received instructions as to the shortest home route.

Mr. Hale also spoke on the proposed cancellation of per diem rule 5, to abolish reclaim allowances, which has been postponed to January 1. He said that Commissioner Harlan of the Interstate Commerce Commission was anxious to see the reclaim abolished because it had been made a source of profit to certain industries owning industrial railways, but that many felt that the 15 or 20 industrial roads should be affected rather than the rule. It has also been suggested that reclaim allowances be based on actual time instead of an arbitrary amount. At any rate he felt that if any road should withdraw from the per diem agreement because of the abolition of reclaims the other roads would have the sympathy of the commission and that only the question as to what is best for all roads should be considered, without reference to the fear that some lines will withdraw.

J. R. Pickering, L. M. Betts, car accountant of the Chicago & Western Indiana, and W. E. Beecham, car accountant of the Chicago, Milwaukee & St. Paul, were appointed a committee to determine a uniform method of handling home route bad order cars and to present it at the meeting of the Association of Transportation and Car Accounting Officers at Galveston.

#### Railway Business Association.

Over 800 reservations have already been made for the annual dinner of the Railway Business Association, which will be held at the Waldorf-Astoria hotel, New York, on Thursday, December 11.

#### MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May, 1914.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpfen building, Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 9-10, Galveston, Tex.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 20-22, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, December 11, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; 1st Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3rd Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Karpen building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

## Traffic News.

The Ann Arbor announces that its car ferry between Frankfort and Menominee, Mich., will be discontinued for the winter season on December 10. It is expected to resume operation about April 1.

The extra fare of \$10 which was charged on the Sunset Limited train on the Southern Pacific between New Orleans and San Francisco when the train ran only once a week has been discontinued now that the train runs daily.

The Southwestern Traffic Committee, following a conference at Chicago on November 13 with representatives of a large number of shipping organizations, announced that it would cancel its circular making a charge for tariffs and that money already collected would be refunded.

A new passenger train was placed in service on November 16 by the Chicago, Rock Island & Pacific between Minneapolis, St. Paul and Kansas City, leaving Minneapolis at 2:05 p. m., and arriving at Kansas City at 8:30 a. m. the following day to connect with the Golden State Limited.

Beginning on December 2, a standard sleeping car will be run weekly between Winnipeg, Man., and Los Angeles, Cal., over the Canadian Pacific and the Soo Line to St. Paul, the Omaha and North Western to Omaha, the Union Pacific, and the San Pedro, Los Angeles & Salt Lake to Los Angeles.

The Grand Trunk, the Canadian Pacific, and the Canadian Northern have filed with the Canadian Railway Commission new tariffs making a general advance of 5 per cent. in freight rates—an advance calculated on the same basis as that which is proposed in the United States by the principal roads east of the Mississippi river.

Samuel O. Dunn, editor of the *Railway Age Gazette*, will address the Traffic Club of Chicago on November 25, on "The Railway Employee and the Railway Patron," dealing especially with the effect both on the railways and the traveling public of recent changes in wages and working conditions of employees that have been brought about by arbitration proceedings and legislation.

In California, where the demurrage on all freight cars delayed by consignees an unreasonable length of time is \$3 a day, one agent reports that the manager of an iron works, employing 135 men, calls men out of the shops, when necessary, to assist in unloading cars so as to avoid paying demurrage. He pays his ordinary laborers \$2 a day, but when the free time is nearly up it is found profitable to put on some higher-priced men rather than pay \$3 for a fractional part of a day.

The Chicago & Northwestern and the Union Pacific on November 16 reduced the schedule of the San Francisco Limited train by 1 hour and 45 minutes westbound and 9 hours and 20 minutes east bound. The train will leave Chicago at 9:30 p. m., arriving at San Francisco at 7:45 p. m. the third day, or 74½ hours through, the difference in time between the two cities being 2 hours. Eastbound it will leave San Francisco at 5 p. m. and arrive at Chicago at 4:30 p. m. the third day, or 69½ hours through. On the same date the Oregon-Washington Limited will be changed to leave Chicago at 9:30 p. m. instead of 8:30, arriving at Portland at 7:15 p. m. the third day.

B. D. Caldwell, president of Wells, Fargo & Co., in his annual report, says that the parcel post competition met in the latter half of the fiscal year ended June 30 cost the company approximately \$1,250,000 in gross earnings. He warns stockholders that further inroads on the company's business may be expected as a result of the extension of the weight limit within the 150-mile radius. Continuing, he says: "The company is now confronted with the most difficult problem in its history as a result of the radical reduction in rates ordered by the Interstate Commerce Commission. Many of the new rates are lower than those of the parcel post. Estimates reached by their application to actual business of typical days indicate from 12 to 15 per cent. reduction in the company's rates as a whole. . . ."

Roads members of the Western Classification Committee have under consideration and will take a vote on a plan of reorgan-



ization of the committee providing for several permanent members who would maintain headquarters at Chicago and give continuous attention to that work of the committee which involves changes in classification ratings and other provisions, instead of leaving all to be dealt with at stated meetings held at various places, usually semi-annually. Under the present plan the members of the committee are delegated by the various roads and at the regular meetings handle very large dockets. If the plan is carried out it would probably mean the abandonment of the meeting called to be held at Monterey, Cal., in January. Such a plan has been advocated by the National Industrial Traffic League, and it is understood it is approved by the Interstate Commerce Commission.

President Ripley, of the Atchison, Topeka & Santa Fe, has notified farmers in Colorado and other states traversed by his road that if they will continue raising garden truck and fruit next year his road will establish a special refrigerator service adapted to their needs. Through this means

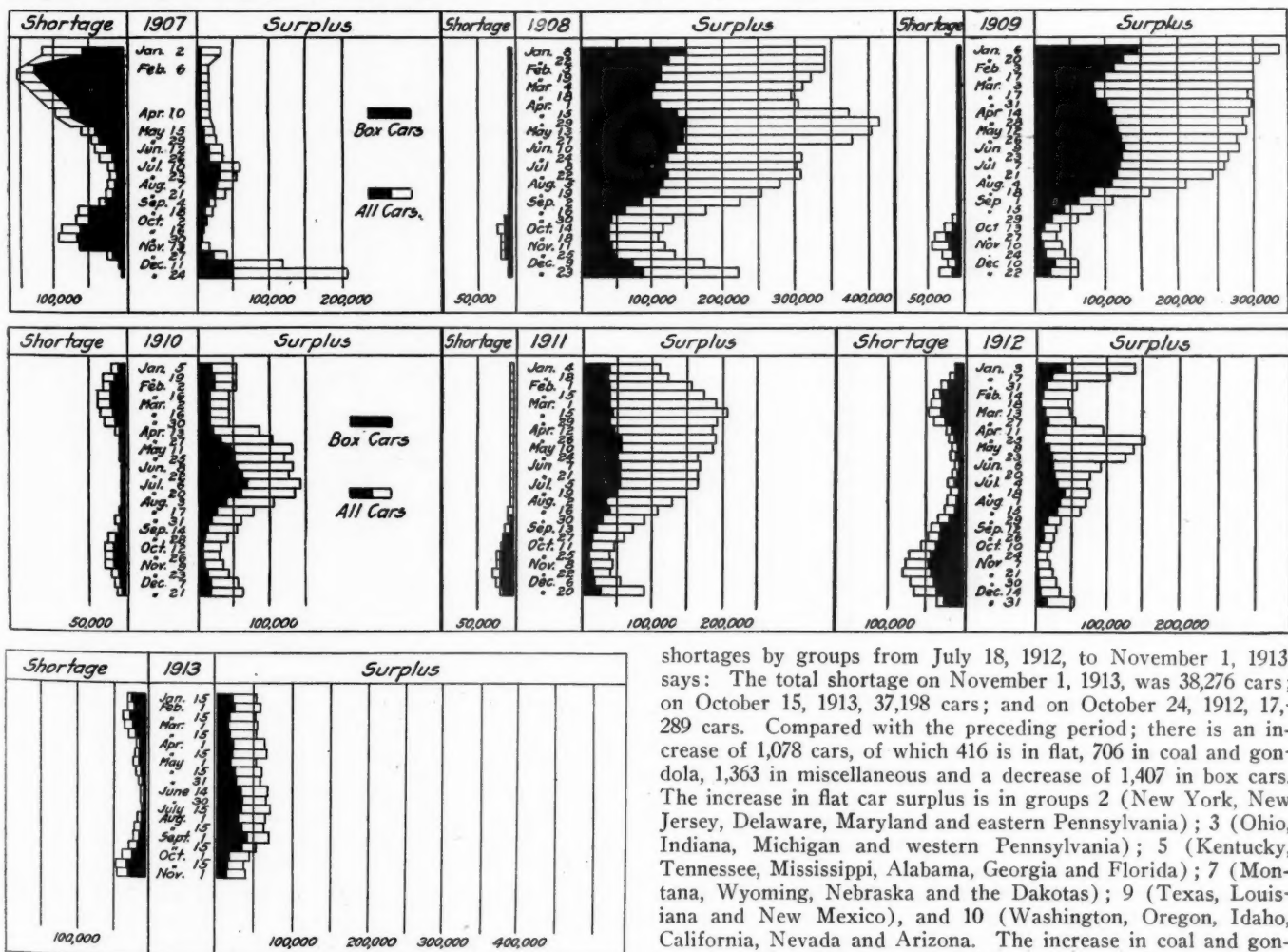
Mr. Ripley believes he will overcome the present problem of many farmers—losses suffered because local markets are glutted and the expense of selling in small quantities at distant markets, which consumes the difference between the cost of production and the selling price. The new plans provide for running regular refrigerator cars which on given days will pick up small fruit and vegetable consignments. These shipments will be taken to terminal points, where each variety of fruit or vegetable will be made into carload lots and then taken to market. It is said that President Ripley was impelled to this step by paying five cents each for peaches in Kansas City, and the next day observing a wagonload of peaches being fed to hogs near the Colorado-Kansas line.

### Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 155, giving a summary of car surpluses and

CAR SURPLUSES AND SHORTAGES.												
Date		No. of roads.	Surpluses				Shortages					
			Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—	November 1, 1913.....	7	0	0	86	225	311	461	130	67	5	663
" 2.—	" 1, 1913.....	33	438	51	428	320	1,237	1,161	6	2,331	7	3,505
" 3.—	" 1, 1913.....	27	47	237	220	451	955	4,389	85	3,100	817	8,391
" 4.—	" 1, 1913.....	13	3,157	677	691	568	5,093	2,325	432	4,960	587	8,304
" 5.—	" 1, 1913.....	23	23	232	287	549	1,091	966	60	607	10	1,643
" 6.—	" 1, 1913.....	28	1,865	211	1,134	2,536	5,746	1,992	35	363	575	2,965
" 7.—	" 1, 1913.....	4	186	153	34	737	1,110	10	0	118	0	128
" 8.—	" 1, 1913.....	18	732	217	1,218	1,850	4,017	818	39	390	7	1,254
" 9.—	" 1, 1913.....	13	3,828	203	425	716	5,172	200	0	13	18	231
" 10.—	" 1, 1913.....	24	2,669	1,057	2,197	6,505	12,428	1,543	119	146	369	2,177
" 11.—	" 1, 1913.....	5	284	334	0	498	1,116	9,053	625	500	679	10,857
Grand total .....		195	13,229	3,372	6,720	14,955	38,276	22,918	1,531	12,595	3,074	40,118

\*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



Car Surpluses and Shortages, 1907 to 1913.

shortages by groups from July 18, 1912, to November 1, 1913, says: The total shortage on November 1, 1913, was 38,276 cars; on October 15, 1913, 37,198 cars; and on October 24, 1912, 17,289 cars. Compared with the preceding period; there is an increase of 1,078 cars, of which 416 is in flat, 706 in coal and gondola, 1,363 in miscellaneous and a decrease of 1,407 in box cars. The increase in flat car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and eastern Pennsylvania); 3 (Ohio, Indiana, Michigan and western Pennsylvania); 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida); 7 (Montana, Wyoming, Nebraska and the Dakotas); 9 (Texas, Louisiana and New Mexico), and 10 (Washington, Oregon, Idaho, California, Nevada and Arizona). The increase in coal and gondola car surplus is in groups 5 (as above), 6 (Iowa, Illinois, Wisconsin and Minnesota); 8 (Kansas, Colorado, Oklahoma,

Missouri and Arkansas) and 10 (as above). The increase in miscellaneous car surplus is in groups 1 (New England Lines); 4 (the Virginias and Carolinas); 5, 6, 7, 8 and 10 (as above). The decrease in box car surplus is in groups 2, 3, 8, 10 (as above) and 11 (Canadian Lines).

The total shortage on November 1, 1913, was 40,118 cars; on October 15, 1913, 43,246 cars; and on October 24, 1912, 67,270 cars. Compared with the preceding period; there is a decrease in the total shortage of 3,128 cars, of which 2,103 is in box, 579 in flat and 539 in miscellaneous car shortage, and an increase of 92 in coal and gondola car shortage. The decrease in box car shortage is in groups 4, 5, 6 and 7 (as above). The decrease in flat car shortage is in all groups, except 2 and 11 (as above). The decrease in miscellaneous car shortage is in groups 2, 3, 5, 7 and 8 (as above). The increase in box car shortage is in groups 1, 2, 3, 8, 9, 10 and 11 (as above).

Compared with the corresponding period of 1912; there is an increase in the total car surplus of 20,987 cars, of which 11,050 is in box, 2,175 in flat, 1,597 in coal and gondolas and 6,165 in miscellaneous car surplus. There is a decrease in the total car shortage of 27,152 cars, of which 17,438 is in box, 3,503 in flat, 5,781 in coal and gondolas, and 430 in miscellaneous car shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1913.

#### Increase Passenger Rates.

From canvasses that have been made it is quite apparent that a majority of the manufacturers and shippers are in favor of an advance of 5 per cent. in freight rates. We suppose this conclusion is reached because the shipping public feels that the labor unions have taken so much money away from the railroads in increased wages that it is absolutely necessary to allow the advance.

*Manufacturers' News* is in favor of going to the mat with the labor union organizations controlling the railroad situation. It seems to us the thing to do is to give the railroads authority to increase the passenger rates. If every person who rides on a railroad, especially that great army of citizens who use commutation tickets, was compelled to pay a little more car fare every time a brotherhood forced an increase in wages, public sentiment would be materially changed.

An incident occurred in England not long ago which strongly illustrates what would happen if the railroads had power to put the increased wages on the passenger side of the books. One union that had to do with the operating of the railroads, went on a strike in England for an increase in wages. An arbitration committee was appointed and with the usual result a compromise was effected and the men obtained a considerable advance. The railroads immediately placed the advance on the passengers. Not long afterwards, the engineers concluded they would reach into the railroad crib and take a little more money, so they threatened to strike. Public sentiment rose up so strongly that they were forced to withdraw their demands. The people saw at once that another increase meant another increase in passenger rates.—*Manufacturers' News*.

#### INTERSTATE COMMERCE COMMISSION.

##### Rates on Citrus Fruits Reduced.

*Railroad Commissioners of the State of Florida v. Atlantic Coast Line et al. Opinion by Commissioner Prouty:*

The commission found that the rate of 33 cents per 100 lbs. c. l., and 35 cents per 100 lbs. l. c. l., for the transportation of citrus fruits from landings on the upper Caloosahatchee river in Florida to Jacksonville, Fla., when for beyond are unreasonable to the extent that they exceed 31 cents c. l. and 34 cents l. c. l., and prescribed those rates for the future. (28 I. C. C., 356.)

##### Storage Charges in Central Freight Association Territory.

*Opinion by Commissioner Clements:*

The commission found that the uniform storage rules and rates filed by carriers in Central Freight Association territory,

were unreasonable in certain particulars, and in view of the substantial increases permitted in storage charges on explosives and other dangerous articles, the carriers will be required to notify consignors, in case request is properly made of failure or refusal of consignees to remove shipments of such articles within the time prescribed. (28 I. C. C., 372.)

#### Dates from Which Reparation Is to Be Awarded.

*In re Investigation of Alleged Unreasonable Rates and Passages Involved in the Transportation of Live Stock, Packing House Products and Fresh Meat from Various Southwestern Points to Packing Houses, and Thence to Various Destinations.*

*Corporation Commission of Oklahoma v. Atchison, Topeka & Santa Fe, et al. Opinion by Commissioner Prouty:*

This case involves the dates from which reparation is to be awarded on shipments of live stock, fresh meat and packing house products between points in Texas, Oklahoma, and other territory. The commission on December 11, 1911, established certain reasonable rates on these commodities, 22 I. C. C., 160, and subsequently, on May 13, 1912, made certain slight modifications in those rates, 23 I. C. C., 656. The commission decided that following the conclusions reached in *Wool Investigation*, 25 I. C. C., 675, reparation should be awarded from the date of the promulgation of the original opinion, subject to the two-year limitation from the date of filing petition for reparation. (28 I. C. C., 332.)

#### Columbia, S. C. Discriminated Against.

*Columbia Chamber of Commerce v. Southern Railway, et al. Opinion by Commissioner McChord:*

In this case the complainant contends that Columbia, S. C., is unduly discriminated against in favor of Augusta, Ga., in rates from eastern and western points of origin. Augusta and Columbia are similarly located so far as transportation by rail is concerned inland from Savannah, Ga., and Charleston, S. C., and also with respect to competition with each other and with the ports named. On traffic from the east the carriers recognize similarity of rail situations by equalizing the class rates to these cities. The commission decided that with respect to commodity rates from the east and to class and commodity rates from Cincinnati, Ohio, Louisville, Ky., and Knoxville, Tenn., the differences in the rail location of the two cities in question, or in their competitive relationship to the ports, are not sufficient to justify the present differences in rates in favor of Augusta, and ordered that in future the rates from these points of origin to Columbia should not exceed the rates from the same points to Augusta. The commission also ordered that on specific commodities by rail, or by water-and-rail, from Baltimore, Md., to Columbia, rates shall not exceed those from the same points to Augusta. Rates on classes and on specific commodities from Cincinnati, Louisville and Knoxville, must not exceed those from the same places to Augusta. From the lower Ohio river crossings and the Mississippi river crossings and from Nashville, no change need be made in the present differentials over or under the rate from Cincinnati-Louisville to Augusta or to Columbia, as Columbia will derive all the relief in the rates from these gateways to which it is entitled by reason of location through the adjustment of the rates from Cincinnati-Louisville. (28 I. C. C., 339.)

#### STATE COMMISSIONS.

The Illinois Railroad and Warehouse Commission has suspended tariffs, advancing Illinois freight rates by approximately 5 per cent. from November 15 to March 12, 1914.

The Ohio Utilities Commission has ordered the Wabash Railroad to limit the speed of trains over a stretch of 80 miles of its line in northern Ohio because of unsatisfactory condition of the track.

The Kansas public utilities commission will hold a hearing December 18, to investigate the efficiency of the transportation facilities and service furnished at the Kansas City stock yards by the stock yards company and other carriers.



REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1913.

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance		Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) income comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans- portation.	General.	Total.				
Alabama Great Southern .....	309	\$284,851	\$116,594	\$437,411	\$7,902	\$103,378	\$14,714	\$140,992	\$8,880	\$325,866	-\$163	\$15,700	\$95,682	\$20,656
Arizona Eastern .....	367	172,272	39,305	223,184	33,300	33,701	1,922	61,668	10,983	141,574	76	14,147	67,539	43,031
Atlantic & St. Lawrence .....	167	65,225	44,625	120,265	30,058	16,452	4,807	60,547	5,325	120,189	76	10,157	10,157	15,228
Atlantic City .....	167	64,556	141,527	222,440	30,381	14,044	2,700	115,560	1,067	163,752	-2,970	9,000	46,718	9,125
Baltimore & Ohio—System .....	4,456	7,135,703	1,579,078	9,197,853	1,156,590	1,604,171	198,674	3,287,585	206,229	6,483,249	-68,282	269,197	2,407,125	93,279
Bingham & Garfield .....	26	150,989	4,436	155,788	5,667	22,014	945	24,233	2,559	55,418	.....	3,028	97,342	60,121
Butte, Anaconda & Pacific .....	90	98,916	12,607	122,440	18,194	18,194	579	46,198	2,904	86,775	.....	2,250	33,415	12,841
Canadian Pacific Lines in Maine .....	233	52,713	23,063	75,759	34,600	34,600	5,801	38,470	5,463	100,479	.....	11,000	-25,720	-2,562
Central Vermont .....	536	229,562	124,628	380,795	77,806	55,012	9,144	176,467	8,873	327,302	907	38,900	38,900	50,696
Chicago & Eastern Illinois .....	1,282	1,070,102	282,128	1,466,305	324,446	350,650	26,594	511,751	38,644	1,252,085	-3,095	45,000	166,125	-85,241
Chicago, Indianapolis & Louisville .....	617	411,961	166,145	635,345	96,776	93,989	23,879	226,361	14,582	455,529	.....	24,373	155,443	-41,678
Chicago, Milwaukee & St. Paul .....	9,690	6,107,385	1,888,273	8,675,621	1,297,065	1,282,023	165,377	2,896,140	134,565	5,775,170	46,167	32,336	2,614,282	-453,574
Cincinnati, New Orleans & Texas Pacific .....	337	685,446	190,543	916,659	91,912	239,672	23,668	242,108	18,916	616,276	621	31,000	270,004	3,247
Colorado & Southern .....	1,131	604,085	175,715	821,261	118,082	189,486	10,249	230,706	21,588	570,111	-777	30,675	219,698	25,498
Delaware & Hudson Co.—R. R. Dept. ....	854	1,697,470	346,208	2,106,778	150,626	321,419	28,517	691,900	57,593	1,250,055	-2,679	49,700	804,344	15,569
Denver & Rio Grande .....	2,585	1,612,524	626,629	2,339,314	365,018	384,324	46,069	660,870	52,832	1,509,113	3,485	97,000	736,686	-90,374
Detroit & Toledo Shore Line .....	79	127,756	.....	128,885	15,933	6,874	1,688	33,548	2,655	60,698	.....	5,900	62,287	17,555
Detroit, Grand Haven & Milwaukee .....	191	115,000	73,000	219,579	33,123	25,693	8,282	101,741	5,382	174,221	97	3,600	41,855	21,141
Duluth, South Shore & Atlantic .....	627	175,599	112,625	310,625	110,867	34,962	9,704	109,164	10,950	275,647	2,303	18,000	19,281	-26,105
Duluth, Winnipeg & Pacific .....	166	104,443	20,278	129,561	26,641	20,713	2,057	60,421	5,315	115,147	.....	6,478	7,936	2,531
Florida East Coast .....	683	144,149	100,302	279,786	72,658	63,963	4,792	118,871	10,721	271,005	-1,509	20,000	-12,728	-10,496
Fort Worth & Denver City .....	454	270,874	143,325	434,805	67,657	83,387	6,304	162,526	14,889	324,963	-798	18,200	90,844	-93,496
Galveston, Harrisburg & San Antonio .....	1,338	825,006	271,450	1,145,523	89,174	212,744	34,948	395,249	32,763	764,878	-1,835	56,939	321,871	40,065
Georgia .....	307	197,418	76,889	292,796	26,579	49,251	10,988	132,367	9,939	229,394	.....	2,950	60,452	40,798
Grand Trunk Western .....	347	361,000	214,000	613,127	64,298	115,204	26,695	289,302	19,714	515,213	1,659	31,500	64,755	-90,953
Great Northern .....	7,748	6,487,389	1,763,702	8,646,052	1,086,407	859,324	119,967	2,009,553	110,652	4,186,103	30,752	436,879	4,053,822	520,199
Hocking Valley .....	352	648,886	96,679	801,990	89,634	129,933	7,835	242,105	15,928	485,437	.....	41,000	275,553	20,047
Houston, East & West Texas .....	191	83,847	33,781	124,259	13,682	10,330	1,993	39,596	4,049	69,550	.....	5,473	49,236	-3,964
International & Great Northern .....	789	460,147	179,325	677,234	66,206	85,540	14,925	245,228	17,373	429,272	-70	29,781	218,111	8,907
Louisiana & Arkansas .....	1,160	787,980	218,341	1,063,573	91,428	121,518	24,633	374,748	30,758	643,085	-843	24,841	394,804	-102,841
Louisiana Western .....	279	107,679	22,208	134,771	25,926	34,337	2,429	36,576	5,141	89,202	.....	4,166	41,411	9,179
Missouri, Kansas & St. Louis .....	208	135,593	69,696	205,571	20,773	19,340	6,969	60,611	6,832	129,922	254	3,675	76,228	22,350
Missouri, Kansas & Gulf .....	376	1,982,960	696,696	2,828,180	340,905	410,886	57,050	823,758	56,203	1,688,028	29,087	106,988	1,430,481	-197,856
Missouri, Oklahoma & Gulf .....	381	1,853,202	823,292	2,874,535	406,414	353,109	63,320	1,035,718	7,497	1,951,814	-13,742	106,988	801,914	-168,830
Morgan's La. & Texas R. & S. Co. ....	332	72,961	21,016	97,316	18,929	17,536	6,417	47,154	7,497	97,533	362	6,000	-5,855	-3,885
New Orleans, Texas & Mexico .....	404	256,755	99,812	384,619	46,397	67,584	9,137	150,052	12,847	285,657	-2,002	18,250	78,710	14,163
New York Central & Hudson River .....	286	89,325	17,056	112,308	32,562	10,886	3,440	48,577	13,403	108,868	.....	1,434	2,006	-13,442
New York, Chicago & St. Louis .....	3,751	6,107,213	3,799,907	10,825,398	1,605,147	1,939,460	196,337	3,562,558	253,111	7,566,610	13,925	354,354	2,748,359	285,859
New York, Ontario & Western .....	566	835,182	166,100	1,033,518	126,418	160,813	46,490	400,083	17,104	750,947	-2,420	36,000	244,151	-62,256
Norfolk Southern .....	566	622,922	165,016	830,533	143,104	143,058	11,813	284,802	17,104	599,881	-1,794	18,000	210,858	-9,046
Oahu Ry. & Land Co. .....	569	162,137	67,684	252,880	33,618	41,076	5,053	81,630	16,321	177,698	-331	9,210	65,641	-20,692
Oregon-Washington Railroad & Nav. Co. ....	101	66,864	26,030	98,504	9,001	7,087	661	21,954	4,515	43,218	.....	5,580	41,495	-5,255
Pecos & Northern Texas .....	1,914	1,227,213	535,614	1,875,558	263,983	199,537	52,403	562,298	60,046	1,138,267	-1,317	112,968	611,441	-128,421
Philadelphia & Reading .....	482	156,235	41,238	208,308	27,234	33,357	3,312	64,826	5,632	134,381	.....	7,822	66,105	-9,502
Port Reading .....	1,020	3,270,242	640,038	4,101,768	482,096	788,583	44,617	1,337,318	58,867	2,711,481	15,657	102,809	1,303,135	-442,655
St. Louis Merchants' Bridge Terminal .....	21	111,999	.....	113,523	20,357	1	30	32,403	1,694	54,485	-6,617	10,000	42,421	-64,218
San Pedro, Los Angeles & Salt Lake .....	9	.....	392	167,886	48,204	12,731	749	86,104	5,704	153,492	.....	5,600	8,794	-37,584
Southern .....	1,133	524,118	261,580	845,422	100,818	159,891	29,628	276,795	18,047	584,179	-1,317	40,378	219,548	-66,125
Southern Pacific Co. .....	7,036	3,792,119	1,695,023	5,905,776	854,592	968,822	178,376	1,994,782	170,228	4,166,804	673	207,149	1,532,496	-115,433
Spokane International .....	6,329	5,125,434	2,650,068	8,406,807	900,583	1,115,845	155,738	2,249,908	227,567	4,650,041	183,344	401,289	3,538,821	-471,140
Spokane, Portland & Seattle .....	163	69,189	24,850	99,411	13,277	4,357	1,886	27,837	3,334	51,271	.....	3,020	45,120	4,465
Terminal Railroad Ass'n of St. Louis .....	556	289,270	153,009	480,561	61,614	36,895	8,204	111,308	13,158	231,179	1,787	53,400	197,769	9,858
Texas & New Orleans .....	34	237,933	110,382	366,832	50,233	20,373	955	92,756	12,560	168,528	-1,601	19,376	63,370	-28,210
Texas & Pacific .....	458	1,037,874	387,974	1,523,811	230,631	276,034	41,779	615,052	39,540	1,193,036	-6,115	48,300	276,360	68,848
Union Pacific .....	1,885	3,608,104	1,030,675	5,056,610	597,535	609,648	105,040	1,202,194	126,138	2,640,555	-4,675	176,087	2,335,293	-237,902
Vandalia .....	910	729,552	241,034	1,072,113	145,875	183,098	28,787	383,574	19,614	760,944	.....	30,316	280,853	-45,998
Virginia & Southwestern .....	240	148,928	17,945	172,243	24,032	40,850	1,944	47,224	3,669	117,719	.....	5,909	48,615	14,997
Virginian .....	503	519,090	36,936	569,534	77,973	90,459	6,598	120,910	9,630	305,570	7,750	20,075	251,639	100,217
Wabash .....	2,515	1,834,941	699,595	2,765,862	289,089	469,212	28,109	1,042,338	68,780	1,933,130	-4,121	74,448	734,184	-108,773
Western Maryland .....	661	596,272	110,932	739,469	122,981	108,088	22,193	311,945	18,892	584,099	.....	19,000	136,370	-27,844
Western Pacific .....	934	468,490	135,056	618,942	118,786	59,246	29,769	202,344	25,159	435,304	-1,744	31,707	150,187	-58,843

Arthur B. duBray, inspector of electric signals of the St. Louis & San Francisco, with office at Springfield, Mo., has been appointed signal engineer for the Missouri Public Service Commission, with headquarters at Jefferson City, Mo., effective December 1.

The New York State Public Service Commission, First district, has ordered the Long Island Railroad to discontinue, as far as possible, the use of wooden cars in its electrically propelled trains; and from September 15, 1914, to discontinue them absolutely; that is to say, to have all electric trains made up wholly of steel cars.

The Committee on Express Service and Rates, Martin S. Decker, chairman, which was appointed by the National Association of Railway Commissioners at the recent convention in Washington, will hold a meeting in Chicago, December 11, to consider a uniform method of prescribing rates for the intrastate transportation of merchandise by express. Mr. Decker proposes that the individual states adopt a plan similar to that which has been prescribed by the Interstate Commerce Commission for interstate express traffic throughout the whole country.

J. L. Harrop, engineer of the Missouri Public Service Commission, has submitted a report recommending the abolition of a large number of grade crossings of streets and railways in St. Louis, the cost to be divided between the railways and the city. The roads are required by an order of the commission to submit plans for the improvements within a specified time and meanwhile to protect crossings by the installation of gates or automatic alarm signals. Several roads have notified the commission that they will comply at once with the latter order.

The Railroad Commission of Louisiana has imposed a fine of \$500 on the Yazoo & Mississippi Valley for failing to comply with the flagging rule established by the Commission some months since. On the evening of September 26, at Pecan Grove, a freight train, backing into a siding, was run into by a following passenger train, and four persons were injured. The conductor of the freight instructed the flagman not to go back; and as the rules of the road hold conductors responsible for the protection of their trains under all conditions, the Commission does not censure him; but the rule prescribed by the Commission requires a flagman to go back, when it is necessary to protect a train, without waiting for an order from the conductor. As the railroad company did not change its regulations to conform to those issued by the Commission, it is now found guilty of unlawful violation of the rule of the Commission. The attorney general of the state is authorized to file a suit to collect the fine.

The New York State Public Service Commission for the First District has ordered the New York Central & Hudson River to reduce its one-way fares within the city of New York on the Harlem Division and the Hudson Division, so that the through rate from the Grand Central Terminal to any point inside of the city shall not be in excess of the sum of the local rates for the same distance. For example, the order calls for a reduction from 20 to 15 cents between the Grand Central Terminal and the Botanical Gardens on the Harlem Division, 9½ miles. Under the previous tariff the fare from the Grand Central Terminal to Tremont was 10 cents, and from Tremont to Botanical Gardens 5 cents, making a total of 15 cents, so that the passenger who bought a through ticket had to pay 5 cents more than one who paid his fare on the train first to Tremont and then to Botanical Gardens. The reductions affect the fares to Botanical Gardens, Williamsbridge, Woodlawn and Wakefield on the Harlem Division; and to Marble Hill, Spuyten Duyvil, Riverdale and Mount St. Vincent on the Hudson Division.

#### COURT NEWS.

United States Circuit Judges Warrington, Knappen and Denison, at Columbus, Ohio, have rendered a decision holding that the joint ownership of the Kanawha & Michigan by the Lake Shore & Michigan Southern and the Chesapeake & Ohio is illegal and must cease.

## Railway Officers.

### Executive, Financial and Legal Officers.

President W. C. Brown's resignation from the New York Central Lines is commented on elsewhere in this issue.

F. L. Koontz, assistant secretary and assistant treasurer of the Elgin, Joliet & Eastern, has been elected secretary and treasurer, with headquarters at Chicago, succeeding W. K. Allen, resigned. Edward Beecroft succeeds Mr. Koontz.

Frederick H. Wood, whose appointment as general attorney and commerce counsel of the Southern Pacific Company, with headquarters at New York, has already been announced in these columns, was born on January 2, 1877, at Lebanon, Me. He was educated at the Central High School, Kansas City, Mo., and in 1897, graduated from the Collegiate Department of the University of Kansas, and from the Law School two years later. He began the practice of law in Kansas City in June, 1899. In February, 1905, he was appointed assistant general solicitor of the Kansas City Southern, and in January, 1910, was made general attorney and commerce counsel of the Frisco Lines, with headquarters at St. Louis, Mo., which position he held at the time of his recent appointment as general attorney and commerce counsel of the Southern Pacific Company, as above noted.

Edwin I. Grenfell, whose appointment as auditor of the Fort Worth & Denver City, and consulting auditor of the Wichita Valley, with headquarters at Fort Worth, Tex., has been announced in these columns, was born December 8, 1865, at Dodgeville, Wis. He was educated in the public schools and at St. Marks, Salt Lake City, Utah, and was admitted to practice as attorney and counselor-at-law in Colorado in 1894, and as certified public accountant in 1907. Mr. Grenfell began railway work in January, 1883, with the Union Pacific, being employed as local agent until December, 1893, when, owing to receiverships and segregation of properties, he went with the Union Pacific, Denver & Gulf, which was reorganized in 1899 as the Colorado & Southern. He entered the auditing department April 1, 1899, as traveling auditor; in September, 1902, became joint accountant, and in December, 1906, was made chief clerk. In July, 1907, he was made assistant general auditor, which position he held until his recent appointment as auditor of the Fort Worth & Denver City, and consulting auditor of the Wichita Valley, as above noted.



E. I. Grenfell.

entered the auditing department April 1, 1899, as traveling auditor; in September, 1902, became joint accountant, and in December, 1906, was made chief clerk. In July, 1907, he was made assistant general auditor, which position he held until his recent appointment as auditor of the Fort Worth & Denver City, and consulting auditor of the Wichita Valley, as above noted.

### Operating Officers.

H. E. Fell has been appointed trainmaster of the St. Louis, Rocky Mountain & Pacific at Raton, N. M.

J. W. Butz, freight agent of the Missouri, Kansas & Texas at Denison, Tex., has been appointed trainmaster at Greenville, Tex., succeeding K. Randolph, resigned.

Frank O'Brien, assistant superintendent of the Wisconsin division of the Chicago & North Western, has been appointed superintendent of the newly created Southern Illinois division, with headquarters at South Pekin, Ill.

Guy Adams, heretofore mail traffic manager of the St. Louis & San Francisco and the Chicago & Eastern Illinois, has been appointed mail traffic manager of the Union Pacific, with headquarters at Chicago, effective December 1.



**Traffic Officers.**

G. W. Adams has been appointed traveling freight agent of the Galveston, Harrisburg & San Antonio, with headquarters at Houston, Tex.

S. M. Wallace has been appointed commercial agent of the St. Louis & San Francisco at Dallas, Tex., succeeding E. F. Hundley, resigned.

C. B. Austin, traveling freight agent of the Western Maryland, at Toledo, Ohio, has been appointed commercial agent with headquarters at Youngstown, Ohio.

James D. Greer has been appointed industrial agent of the Sunset-Central Lines of the Southern Pacific, with headquarters at Houston, Tex., succeeding H. P. Attwater, resigned.

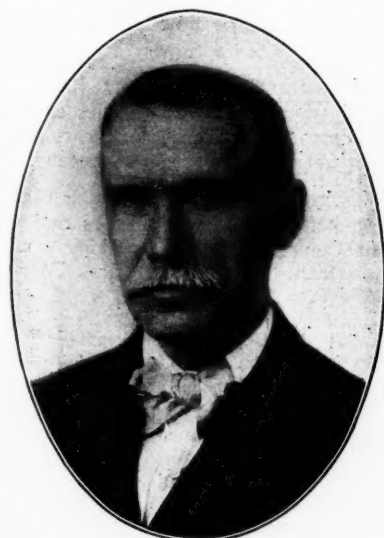
W. B. Durrett has been appointed traveling agent of the Erie Despatch, with office at Little Rock, Ark., and H. H. Weston has been appointed agent, with office at Minneapolis, Minn.

H. E. Still, assistant general freight agent of the Northern Pacific at St. Paul, Minn., has been appointed general western freight agent, with headquarters at Tacoma, Wash., succeeding H. Blakely.

C. W. Mahoney, city passenger and ticket agent of the Great Northern at Spokane, Wash., has been appointed chief clerk to the assistant general passenger agent at Seattle, Wash. J. J. Scherp, traveling passenger agent, with headquarters at Seattle, succeeds Mr. Mahoney and Robert Shaw takes the place of Mr. Scherp.

John B. Baird, who on November 1 became freight traffic manager of the Northern Pacific, as already announced in these columns, was born June 21, 1855, at Woodlawn, Md. He

began railway work in 1876 as a clerk in the general office of the Pennsylvania, at Philadelphia, Pa. Afterwards he went to the Chicago, St. Paul, Minneapolis & Omaha as clerk for the general manager, and subsequently was employed as rate clerk in the general freight office of the Northern Pacific. Later Mr. Baird was promoted to assistant general freight agent of the latter road, in which capacity he served until May 1, 1903. He was then made general freight agent, which position he held until he was appointed freight traffic manager, with head-

**J. B. Baird.**

quarters at St. Paul, Minn., as above noted.

**Engineering and Rolling Stock Officers.**

M. B. Morgan, roadmaster of the Illinois Central at Fulton, Ky., has been appointed assistant engineer maintenance of way at Chicago, succeeding D. W. Thrower.

J. W. Hackett, formerly roundhouse foreman of the Fort Worth & Denver City at Amarillo, Tex., is now master mechanic of the Houston Belt & Terminal with headquarters at Houston. He succeeded M. D. Stewart, resigned.

M. R. Williams has been appointed general foreman of bridges, buildings and water service of the St. Louis, Rocky Mountain & Pacific, with headquarters at Las Vegas, N. M. F. L. Gumm has been appointed roadmaster at Raton, N. M.

Arthur B. duBray, inspector of electric signals of the St. Louis & San Francisco, with office at Springfield, Mo., has been appointed signal engineer for the Missouri Public Service Commission, with headquarters at Jefferson City, Mo., effective December 1.

William G. Arn has been appointed roadmaster of the Indiana division of the Illinois Central, with headquarters at

Mattoon, Ill., in place of Fred B. Oren, who has been transferred to the St. Louis division as roadmaster, with office at Carbondale, Ill., succeeding John F. Plott, resigned.

Edward M. Sweetman, whose appointment as master mechanic of the Southern Railway, with headquarters at Princeton, Ind., has been announced in these columns, was born on February 22,

**E. M. Sweetman.**

1874, at Joplin, Mo., and was educated in the common schools. He began railway work on October 16, 1898, with the East Tennessee, Virginia & Georgia line of the Southern Railway as an apprentice. In 1905 he was promoted from machinist to air brake foreman, and in January, 1907, he was made erecting shop foreman. The following April he became roundhouse foreman, and three months later was transferred to Asheville, N. C., as general foreman, remaining in that position until September, 1907, when he was appointed master mechanic, on the Memphis division, with headquarters at Sheffield, Ala. On January 15, 1910, he was transferred in the same capacity to the Birmingham division, which position he held at the time of his recent appointment as master mechanic on the St. Louis division, with headquarters at Princeton, Ind., as above noted.

**Special Officers.**

Thomas W. Hulme has been appointed real estate agent of the Pennsylvania Railroad, succeeding Benjamin W. Carskadon, deceased. Mr. Hulme was born near Mount Holly, N. J.,

**T. W. Hulme.**

on August 11, 1868. He received a public school education, and later entered the University of Pennsylvania, and received from that institution the degrees of B. S. and C. E. He entered the service of the Lehigh Valley, in the real estate department, in 1890. During the period of the lease of the Lehigh Valley by the Philadelphia & Reading, February, 1892, to August, 1893, he was in the real estate department of the latter company, and also in the president's office. He returned to the service of the Lehigh Valley upon the termination of the lease and was made assistant real estate agent, remaining in that position until June, 1904, when he entered the service of the Pennsylvania Railroad in connection with the work of the real estate department in New York City. In November, 1904, Mr. Hulme was made assistant real estate agent of the New York Connecting Railroad, and on May 1, 1905, was appointed assistant real estate agent of the Pennsylvania System East of Pittsburgh, and was transferred to the general office in Philadelphia. Upon the formation in May, 1913, of a committee of eighteen railroad presidents to look after the interests of the railroads in connection with the valuation of their properties by the Interstate Commerce Commission, Mr. Hulme was elected general secretary of the presi-

dents' committee and was furloughed in order that he might so act.

#### Purchasing Officers.

E. A. Clifford, whose appointment as assistant general purchasing agent of the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has already been announced in these columns, was born August 12, 1878, in Ireland. He was educated in the parochial schools of Chicago and at St. Ignatius College, and commenced railway work in April, 1900, in the purchasing department of the Santa Fe. He filled various minor clerical positions in that department until April 1, 1910, when he was made chief clerk, and from the latter position he is now promoted to assistant general purchasing agent, as above noted.

#### OBITUARY.

C. E. Pfender, auditor and traffic manager of the Chicago & Illinois Western, died at Chicago on November 16.

A. Williams, vice-president and general manager of the Ocean Shore Railroad, died at Seattle, Wash., on November 13, aged 56 years.

Joseph E. Harris, formerly agent of the Star Union Line at Indianapolis, Ind., died in that city on November 13, aged 68 years. Mr. Harris was in the active service of the Pennsylvania Lines for 38 years, and was placed on the pension roll in August, 1911.

George W. Kretzinger, of the firm of Kretzinger & Kretzinger, of Chicago, attorneys for the Grand Trunk, died on November 17, aged 67 years. Mr. Kretzinger has represented the legal department of the Grand Trunk in Indiana and Illinois for the past four years, and previous to 1910 he was for 18 years general counsel for the Chicago, Indianapolis & Louisville.

W. P. Johnson, formerly from 1880 to 1887, general passenger agent of the Lake Shore & Michigan Southern, died at his home in Chicago on November 16. Mr. Johnson was born at Whitehall, N. Y., in 1834, and entered railway service in 1852 with the Western Vermont. He was subsequently with the Chicago, Burlington & Quincy, and in 1854 became a clerk in the office of the general ticket agent of the Illinois Central at Chicago. The following year he was made general passenger agent of that road, which position he held until June, 1880, when he resigned to go to the Lake Shore.

Milton C. Roach, who was for 18 years general eastern passenger agent of the New York Central & Hudson River at New York City, died on October 31, at Montrose, Pa. He was born on September 20, 1852, at Erie Pa., and began railway work in 1873, on the Canada Southern, now a part of the Michigan Central, as clerk in the purchasing department. He was then successively bill clerk in the freight office, chief clerk of the ticket accounts in the auditor's office, passenger agent and city ticket agent at Detroit, Mich.; passenger agent for Michigan, western passenger agent and general northern and southern passenger agent. He then served in the passenger department of different roads until he went to the New York Central in January, 1886, as general agent in the passenger department, at Buffalo, N. Y. The following year he was made general eastern passenger agent at New York, and in September, 1904, was promoted to assistant general passenger agent of the same road, remaining in this position until he resigned and left railway work, in 1907. At the time of his death Mr. Roach was engaged in publishing a book in the interest of Greater New York, with especial reference to its facilities for caring for and catering to visitors, tourists and sightseers. He had a wide acquaintance and was one of the prominent passenger officers who aided in organizing the Railroad Freight & Passenger Association of New York twenty-seven years ago. His widow, two sons and two daughters survive him.

**RAILWAY ACTIVITY IN CHINA.**—The long-discussed projects of the Kaumi-Ichoufu railroads and of a steel mill for Tsingtau have been revived. Careful surveys of the commercial possibilities of the territory through which the railroad would pass were made by the German officials toward the close of 1912. The railroad manager in Tsingtau considers the present situation in Europe the chief obstacle to progress.

## Equipment and Supplies.

### LOCOMOTIVE BUILDING.

THE LEHIGH & NEW ENGLAND has ordered 6 consolidation locomotives, 3 switching locomotives and one other locomotive from the Baldwin Locomotive Works.

THE SOUTHERN RAILWAY OF PERU has ordered 4 consolidation locomotives from the American Locomotive Company. The dimensions of the cylinders will be 16 in. x 26 in., the diameter of the driving wheels will be 52 in., the steam pressure will be 180 lbs., and the total weight in working order will be 110,000 lbs.

THE NEW JERSEY, INDIANA & ILLINOIS has ordered 1 mogul locomotive from the American Locomotive Company. The dimensions of the cylinders will be 18 in. x 24 in., the diameter of the driving wheels will be 50 in., the steam pressure will be 165 lbs., and the total weight in working order will be 120,000 lbs.

### CAR BUILDING.

THE CHESAPEAKE & OHIO is in the market for 2,000 coal cars.

THE ATCHISON, TOPEKA & SANTA FE has ordered 140 passenger train cars from the Pullman Company.

THE LEHIGH VALLEY has ordered 75 coaches from the Pullman Company, and 25 baggage cars from the Standard Steel Car Company.

THE WABASH has ordered 500 gondola car bodies from the American Car & Foundry Company, and is now in the market for 1,000 box cars.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA has ordered 1 combination coach and smoking car, 11 coaches and 2 cafe cars from the Pullman Company, and 5 smoking cars and 6 baggage cars from the American Car & Foundry Company.

THE CHICAGO & NORTH WESTERN has ordered 9 dining cars, 36 coaches, 4 vestibule-parlor cars, 5 observation cars and 6 chair cars from the Pullman Company, and 27 smoking cars, 30 baggage cars and 8 mail cars from the American Car & Foundry Company.

THE LEHIGH & NEW ENGLAND has ordered 500 fifty-ton, all-steel hopper cars from the Pressed Steel Car Company, and 200 forty-ton, all-steel, drop-bottom gondola cars from the Cambria Steel Company. Some of the specialties on these cars will be as follows:

	Hopper.	Gondola.
Wheels .....	National	.....
Bolsters .....	Gould	Gould
Couplers .....	Gould	Simplex
Journal boxes .....	Symington	McCord
Journal bearings .....	Ajax	Ajax
Draft gear .....	Farlow	Miner
Brake beams .....	Davis	Davis
Air brake .....	Westinghouse	.....

### IRON AND STEEL.

**GENERAL CONDITIONS IN STEEL.**—During the past week the volume of new business has apparently diminished even more than during the first week of the month, and as a result of smaller specifications and light orders, furnace and mill operations have been further reduced. Some of the independent steel companies in the eastern territory last week ran about 40 per cent. of capacity, but a much smaller percentage was active in the last few days. In the Central West there is much irregularity in mill operations; some are below 50 per cent. and others above 70 per cent., while in exceptional instances full capacity is still being operated. Because of the intermittent character of operations it is most difficult to determine the exact percentage of capacity, but it is estimated that an average of about 65 per cent. of ingot and finished capacity is now operated, with a prospect that there will be further reductions if there is not a sudden increase in specifications due to larger buying and better rolling schedules on contracts already on the books.



## Supply Trade News.

The Quigley Furnace Company has moved its general offices from Springfield, Mass., to 105 West Fortieth street, New York.

The New York Central & Hudson River has for sale a number of second-hand passenger, freight and switching locomotives for immediate delivery. For further particulars apply to the purchasing agent, Grand Central Terminal, New York.

Horace L. Winslow has disposed of his interest in the Okadee Company. He will give his time exclusively to the Horace L. Winslow Company, Inc., owners of the Winslow locomotive boiler washing and refilling system, which has been installed on a number of leading railroads. The offices of Horace L. Winslow Company, Inc., will remain at 990 Old Colony building, Chicago.

The Easton Car & Construction Company, Easton, Pa., a new concern, has purchased all the stock, rights, plants, office records, equipment and good-will of the Ernst-Wiener Company, New York. W. E. Farrell is the leading spirit in the new company. While the change in ownership is complete the business will be conducted as heretofore. The Eastern Car & Construction Company will make industrial railway equipment, including cars, track, and other appurtenances, and, as a new venture, will make plate, tank and structural steel up to ½ in. in thickness. The company has a newly erected plant at Easton, Pa., which is completely equipped with new special machinery specially adapted to the manufacture of the Ernst-Wiener products. Everything will be sold hereafter under the trade name of the Easton Car & Construction Company.

Edwin S. Woods, head of the railway supply firm of Edwin S. Woods & Co., Chicago, died on November 15 at the home of his parents in Chicago. He was the son of Major John L.

Woods, who was formerly president of the Allen Paper Car Wheel Company and western representative of the Railway Steel Spring Company, and is now with the Buckeye Steel Castings Company. Edwin S. Woods organized the company, of which he was president in 1903, and was previously vice-president of the Kindl Car Truck Company, Chicago. It is announced that the business of the company will be continued as usual. Mr. Woods was 42 years of age, and was very well known by railway and railway supply men throughout the country.



Edwin S. Woods.

Adelbert B. Stetson, consulting engineer for the Bucyrus Company of South Milwaukee, Wis., and formerly vice-president of that company, died on October 27, aged 72 years. Mr. Stetson became connected with the Bucyrus Company in 1888, when he was made superintendent of the old plant at Bucyrus, O. He later had charge of the construction of the new plant at South Milwaukee, Wis., and was subsequently general superintendent for 10 years, being chosen vice-president of the company in 1901. He resigned in 1904 to devote his entire time to various dredging and gold-mining interests with which he had been identified for a number of years. Subsequently, however, he again became associated with the Bucyrus Company as consulting engineer, in which capacity he remained until his death. During the past year he gave considerable time to the supervision of gold-dredging operations in Idaho, and while engaged in this work a severe illness made it necessary for him to return to Milwaukee, where an operation was performed which resulted in his death. Mr. Stetson was one of the first Americans to be identified with the construction of the Panama canal.

## Railway Construction.

**ALL RED LINE RAILWAY.**—Incorporation is being asked for in Canada to build a line from the Atlantic coast at a point west of Cape St. Charles, between the Province of Quebec and Labrador, in a general westerly direction via Sugar Loaf Portage, Que., Martin's Falls, Ont., a point at the northern end of Lake Winnipeg, Man., and then north of Montreal Lake, Sask., to Athabaska Landing, Alta., thence via Fort Frazer, B. C., to a point at the head of Dean inlet on the Pacific coast. A number of branch lines are also projected. J. K. Dowsley, Prescott, Ont., is solicitor for the applicants.

**BISMARCK BELLEVUE VALLEY & WESTERN.**—This company, which was organized last year, has increased its capital, it is said, from \$300,000 to \$1,000,000. The plans call for building from Bismarck, Mo., west via Caledonia and Belgrade to Sunlight, thence south via Lesterville, Centerville and Westfork to Bunker, about 50 miles. It is understood that the new capital will be used to build the section from Sunlight to Bunker, about 30 miles. E. E. Evans, president, Bismarck, and H. Rohwer, chief engineer, St. Louis.

**CANADIAN PACIFIC.**—Application has been made to the Canadian parliament by the Ottawa Northern & Western for an extension of time to build lines and extensions as follows: From Waltham, Que., to Pembroke, Ont., thence northwesterly beyond Pembroke passing to the south of Lake Nipissing, thence about 20 miles south of Callander to Sault Ste. Marie, Ont.; a branch from Waltham northwesterly through the province of Quebec to a point in the county of Pontiac; an extension from Aylmer to Hull, Que., thence across the Ottawa river to Ottawa, Ont.; also a line from Shawville, westerly across the Ottawa river to Pembroke, Ont.

The Tilsonburg, Lake Erie & Pacific has asked the Canadian parliament for an extension of time to build from Ingersoll through the counties of Oxford, Perth, Waterloo, Wellington, Dufferin, Grey and Simcoe, or any of them to a point at or near Collingwood, on Georgian Bay, Ont.

The Thessalon & Northern is applying to the Canadian parliament for an extension of time to complete a line from a point on the Algoma branch of the Canadian Pacific about two miles northeast of Thessalon, Ont., southwesterly to the town of Thessalon, thence northwesterly to a point at or near Thessalon station, and from either of these points northerly to the Mississauga river in Gould township. About 3½ miles of this line has been built and is being operated by the Canadian Pacific.

The Canadian parliament has been asked to extend the time for the construction of the South Ontario Pacific from near Woodstock, Ont., through Brantford and Hamilton to the Niagara river, thence connecting by a ferry or bridge with United States railways; a branch from a point near Cooksville or Toronto, through Hamilton to a point west thereof, and an extension from some point on the existing line through Embro and St. Marys to Lake Huron between Bayfield and Kincardine.

**CHICAGO, BURLINGTON & QUINCY.**—A contract has been given to Kilpatrick Brothers & Collins, Lincoln, Neb., to build from Guernsey, Wyo., west to Wendover, six miles, to connect the line from Billings down the Big Horn valley with the Guernsey line along the Platte river. The work will be very heavy and will include six tunnels, one to be 3,000 ft. long. The cost of the work will be about \$2,000,000.

**DALLAS, SOUTHWESTERN TRACTION.**—An officer writes that contracts are to be let about the first of next year to build from Dallas, Tex., southwest via Grand Prairie, Webb, Mansfield, Venus, Alvarado, Keene and Cleburne to Glen Rose, in Somervell county. The bridges to be built include two 150-ft. steel trusses, two 80-ft. plate girders and one 30-ft. girder. E. P. Turner, president; John T. Witt, chief engineer, Dallas. (July 25, p. 169.)

**DENVER & RIO GRANDE.**—An officer writes regarding the report that a branch is to be built southerly from Price, Utah, for a distance of 25 miles, that it is not probable that construction work will be started this season.

**DETROIT, BAY CITY & WESTERN.**—An officer writes that work is now under way on an extension from Snover, Mich., east to Sandusky, 8 miles, and right of way has been secured for an extension from Sandusky south to Peck, 11.5 miles. (September 19, p. 541.)

**DOMINION ATLANTIC.**—Application has been made to the Canadian parliament for an extension of time to build from the section of the railway formerly known as the Cornwallis Valley Railway, between Kentville and Canning, N. S., westerly to a point on the line between Berwick and Middleton, N. S.

**INTERCOLONIAL.**—A contract has been given to K. A. Morrison, Ottawa, Ont., for work on a diversion of line between Nelson, N. B., and Derby Junction, 2.75 miles. This will complete the diversion of the original lines between Chatham and Derby Junction, the greater portion of which, from Chatham to Nelson, was finished in 1912.

**LEHIGH & NEW ENGLAND.**—An officer writes that a contract has been given to F. H. Clement & Co., Philadelphia, Pa., and work is now under way on a branch from Lehigh Gap, Pa., to Palmerton, 1.18 miles.

**LIBERTY-WHITE.**—An officer writes that the company is building with its own forces a branch from Uniondale, Miss., easterly for a distance of four miles.

**NORTH-WESTERN OF SOUTH CAROLINA.**—An officer writes that contracts have been let to the Smith Kyle Co. and to A. B. Rowzier, Providence, S. C., to build a branch from Seals Sid-ing, S. C., to Rose Hill, 11 miles.

**OCILLA SOUTHERN.**—An officer writes that this company has projected an extension from Rochelle, Ga., north to Macon, 80 miles.

**ONEIDA & WESTERN.**—An officer writes that the contract let to A. M. Cook, Oneida, Tenn., calls for building a section of 15 miles. The company plans to build from Oneida, Tenn., west along Pine creek and White Oak creek, thence northwest to Albany, Ky., 48 miles. The maximum grades will be 2 per cent., and maximum curvature 12 deg. There will be seven small steel bridges on the line. The company expects to develop a traffic in lumber and coal. O. H. Anderson, president, Harriman, Tenn., and R. J. Moscrip, chief engineer, Oneida. (November 14, p. 939.)

**OTTAWA, NORTHERN & WESTERN.**—See Canadian Pacific.

**RIVIERA BEACH & WESTERN.**—An officer of this company, which operates a line from Riviera, Tex., east to Riviera Beach, 10.7 miles, writes that an extension has been projected from Riviera, west to Falfurrias, 25 miles. Steam is used as the motive power for freight traffic, and gasoline motor cars for passenger traffic.

**SOUTH ONTARIO PACIFIC.**—See Canadian Pacific.

**THESSALON & NORTHERN.**—See Canadian Pacific.

**TILSONBURG, LAKE ERIE & PACIFIC.**—See Canadian Pacific.

**WEST VIRGINIA & SOUTHERN.**—An officer of this company, which operates a coal road from Marmet, W. Va., to Kleybolte, five miles, with a branch from Hernshaw to Charlmor, 1.5 miles, writes that surveys are now being made for an extension from Hernshaw for one mile.

#### RAILWAY STRUCTURES.

**CHICAGO.**—The Chicago & Eastern Illinois is building a new office building for the chief engineers, claim agents and a part of the accounting forces, at Sixty-sixth street and Union avenue.

**DALLAS, TEX.**—The Texas railroad commission has authorized an issue of \$2,000,000 of bonds by the Union Terminal Company, to be used in the erection of a new union station for all roads entering the city and it is announced that a beginning of the work will be made on December 1.

**NORRISTOWN, PA.**—The Pennsylvania Railroad has given a contract for the reconstruction of the bridge at Norristown to L. H. Focht & Son, Reading, Pa. The contract for the bridge over the Allegheny river at Kiskiminetas Junction has not yet been let.

## Railway Financial News.

**BALTIMORE & OHIO.**—Charles A. Peabody, president of the Mutual Life Insurance Company of New York, and John G. Shedd, of Marshall Field & Co., Chicago, have been elected directors of the Baltimore & Ohio, succeeding John P. Green and Joseph Wood, retired, who represented the Pennsylvania.

**BUFFALO & SUSQUEHANNA RAILROAD.**—The reorganization committee of the first refunding 4 per cent. bonds has agreed on a plan of reorganization. This plan provides for the exchange of 4 per cent. bonds for \$700 in new first mortgage 4 per cent. bonds, \$300 in new 4 per cent. preferred stock, \$150 in new common, and \$20 in cash for each \$1,000 bond. About 90 per cent. of these bonds are deposited with the reorganization committee. Preferred stockholders pay 10 per cent. in cash and receive \$100 in new first 4 per cent. bonds, \$200 in new 4 per cent. preferred stock and \$300 in new common stock for each \$1,000 of old preferred. There is about \$4,000,000 preferred stock outstanding.

**ILLINOIS CENTRAL.**—The meeting of the stockholders to pass on the question of authorizing a refunding mortgage to cover the lines south of the Ohio river for \$120,000,000 has been postponed to November 21.

**KANSAS CITY, MEXICO & ORIENT.**—The various interests, including the security holders of the construction company, have agreed to submit to Judge Pollock, in the United States district court, a plan of reorganization.

**NATIONAL RAILWAYS OF MEXICO.**—The \$13,000,000 6 per cent. notes which matured on November 17 were paid principal and interest in accordance with the arrangements made in June when \$26,730,000 6 per cent. 2-year notes were sold. The next maturing obligations of the National Railways are \$801,900 interest due on December 1 on notes. Following this there is \$1,910,000 due in January as interest on the 4½ per cent. bonds. No announcement has been made as yet of the arrangements for taking care of these interest payments.

**NEW YORK CONNECTING.**—The Public Service Commission of New York, First district, has approved the issue of a mortgage of \$30,000,000 and the present issue of bonds to the extent of \$11,000,000 under that mortgage. The bonds are to run 50 years and to bear 4½ per cent. interest per annum. They are to be sold at not less than 91 per cent. of par value, and the discount is to be amortized during the life of the bonds. The proceeds will be devoted to the payment of construction expenses, including the refunding of short-term notes made for the purpose of raising money to defray the cost of work already done. The New York Connecting Railroad is owned jointly by the Pennsylvania and the New Haven, and is engaged in building a railroad and bridge to connect the New Haven system at Harlem River station, New York City, with the Long Island Railroad.

**NEW YORK, NEW HAVEN & HARTFORD.**—The company has made arrangements to sell \$45,000,000 6 per cent. notes at 99½, the notes being payable within six months. From the proceeds of the sale of these notes the New Haven will have cash to pay the \$40,000,000 notes maturing December 1 and so be enabled to await the decision of the Massachusetts courts in regard to the issue of \$67,552,000 convertible debentures. The contract for underwriting the debenture sale has been extended to January 28, 1914.

**ST. LOUIS & SAN FRANCISCO.**—Judge Sanborn has authorized the receivers to issue immediately \$3,000,000 6 per cent. one-year receivers' certificates to pay preferred claims.

B. F. Yoakum, in his examination before the chairman of the Interstate Commerce Commission, described the plans that he had had in buying the various lines through the Southwest, including the St. Louis, Brownsville & Mexico. According to his statements, he had planned to have a through line running from St. Louis via Memphis and Baton Rouge along the gulf of Mexico to Brownsville and from there to Matamoros and down the coast to Tampico, and eventually to extend this line to Colon, on the Panama canal.